FEB. 21
1957

★ ANNUAL REPORT AND FORECAST ★

ENGINEERING NEWS-RECORD

Engineers Needed

There is one phrase, better than any other, which characterized our booming construction industry last year, and will continue to do so in the year ahead. It is *Engineers Needed*.

Most familiar as a cry for help in an engineer-short world, the phrase, however, mirrors more than a mere numerical shortage. It also expresses a need for accomplishment on the part of existing engineers, particularly in their role as cost-cutters and inflation fighters.

More engineers are needed, but engineers dedicated to holding down construction costs are equally in demand.

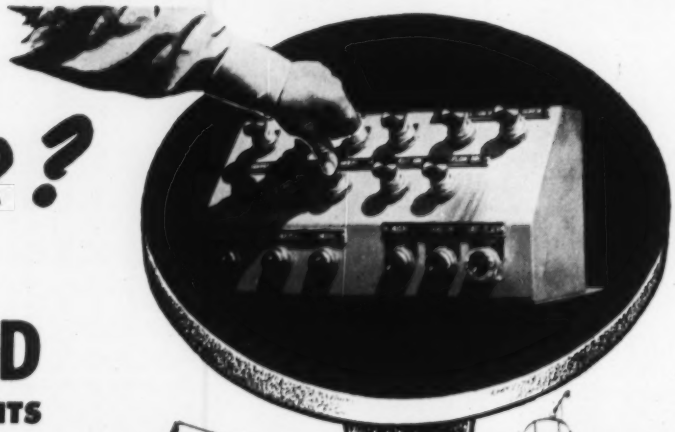
As a new year starts, with every sign pointing to a continuation of the construction boom, nothing is so important as to keep costs under control. In reading this 82nd annual report and forecast, that fact should ever be kept in mind. It is the challenge of the year.

Continued on page 53

THIS ISSUE
$2.00

A McGRAW-HILL PUBLICATION

Could it be SIMPLER?



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The most accurate, flexible and simple means of control—insuring uniformity of every batch.

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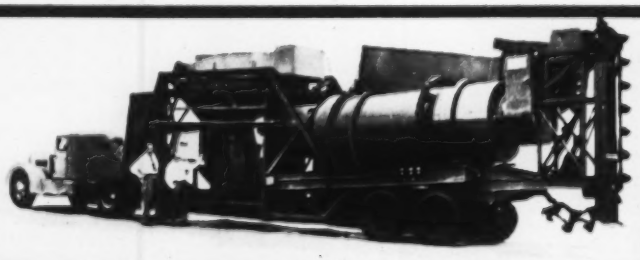
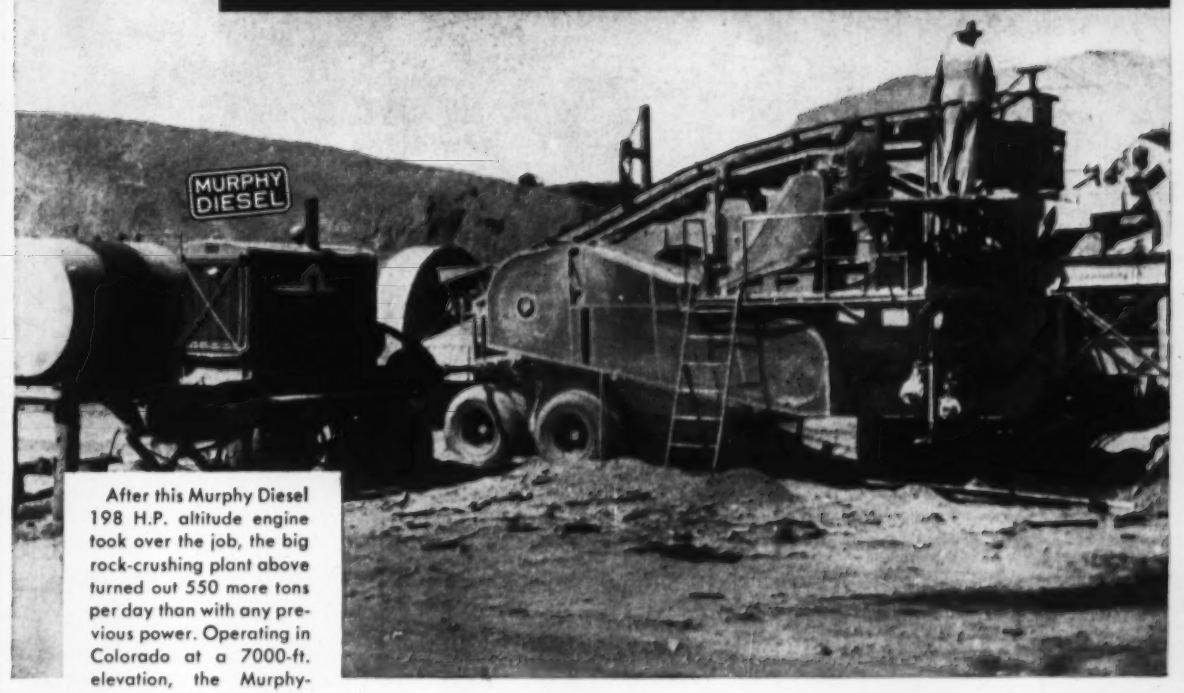


550 **more tons per day . . .**
since they repowered with

MURPHY DIESEL



After this Murphy Diesel 198 H.P. altitude engine took over the job, the big rock-crushing plant above turned out 550 more tons per day than with any previous power. Operating in Colorado at a 7000-ft. elevation, the Murphy-powered plant is making extra profit for its owner.

• Profitable aggregate production depends on the power that drives your crushing plant. Take it from the owner of this Cedarapids Master Tandem who increased production *and profit* by repowering with a Murphy Diesel. Whether you're operating high in the Rockies, or deep in a quarry, take advantage of Murphy's greater fuel economy, longer trouble-free life, and dependability unmatched by any other engine of comparable size.

Ask producers who own Murphy Diesels to give you their opinion about the power that assures more profitable production from any plant—then ask your Murphy Diesel dealer to show you what a difference Murphy can make in your operations.

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Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 K.W.

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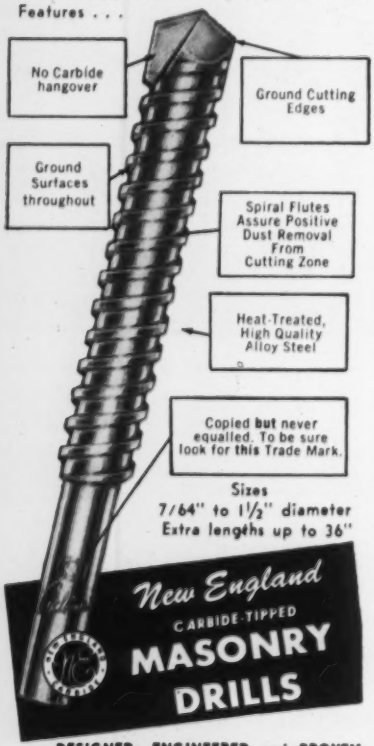
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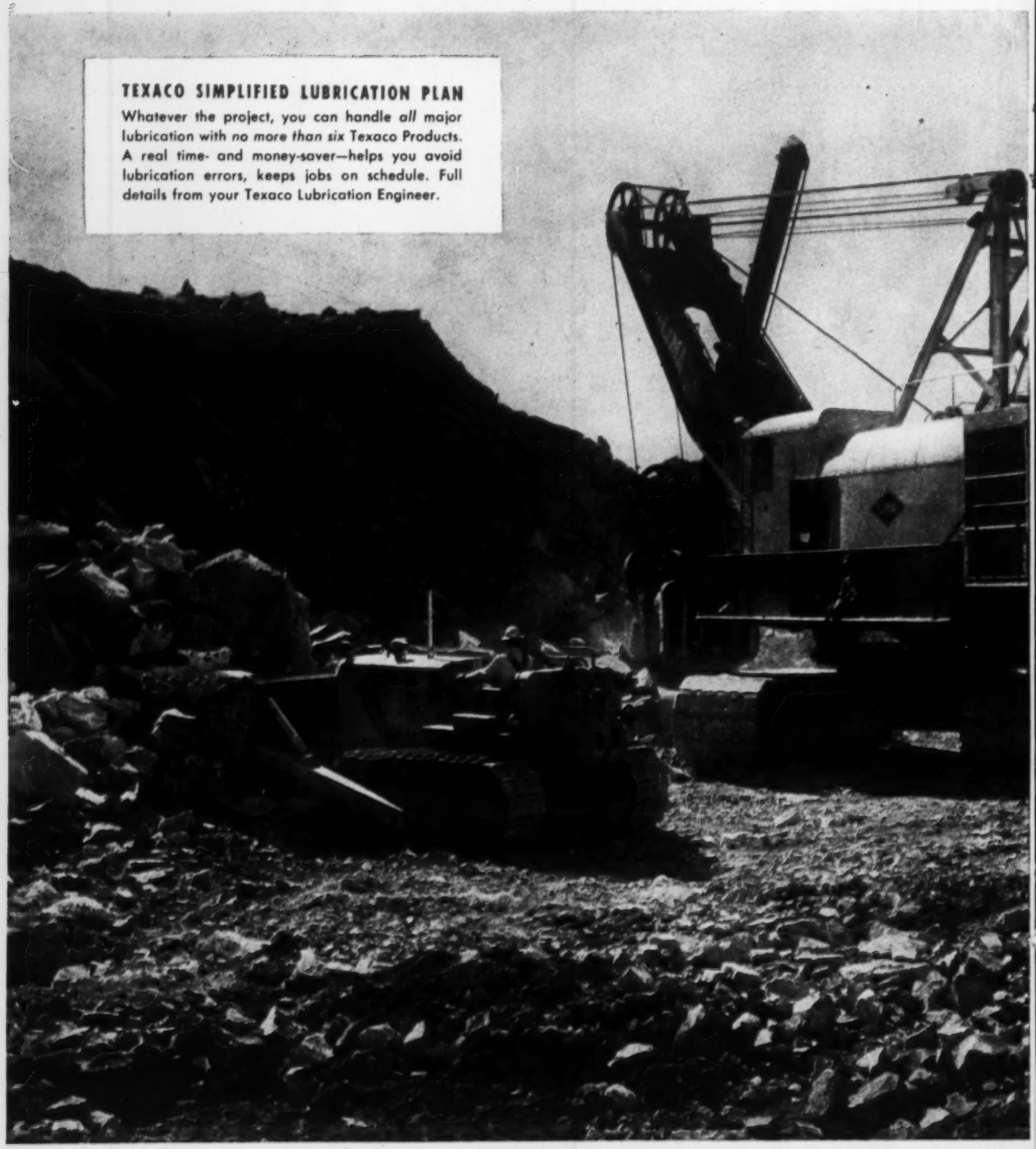
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Whatever the project, you can handle *all* major lubrication with *no more than six* Texaco Products. A real time- and money-saver—helps you avoid lubrication errors, keeps jobs on schedule. Full details from your Texaco Lubrication Engineer.

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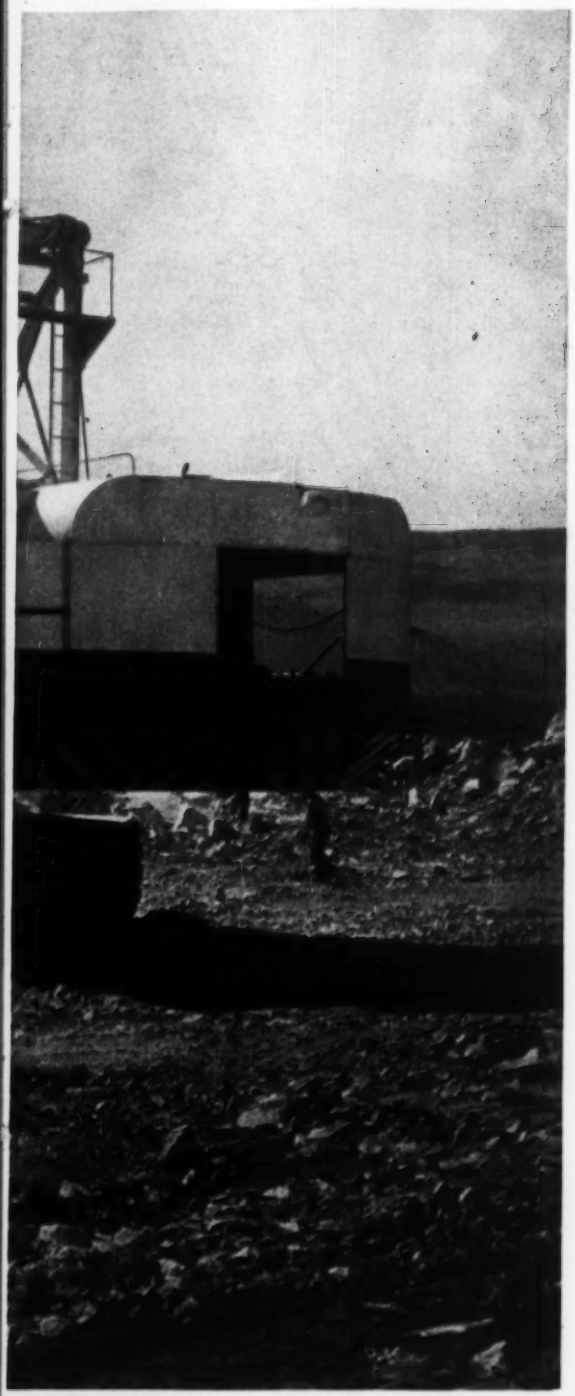

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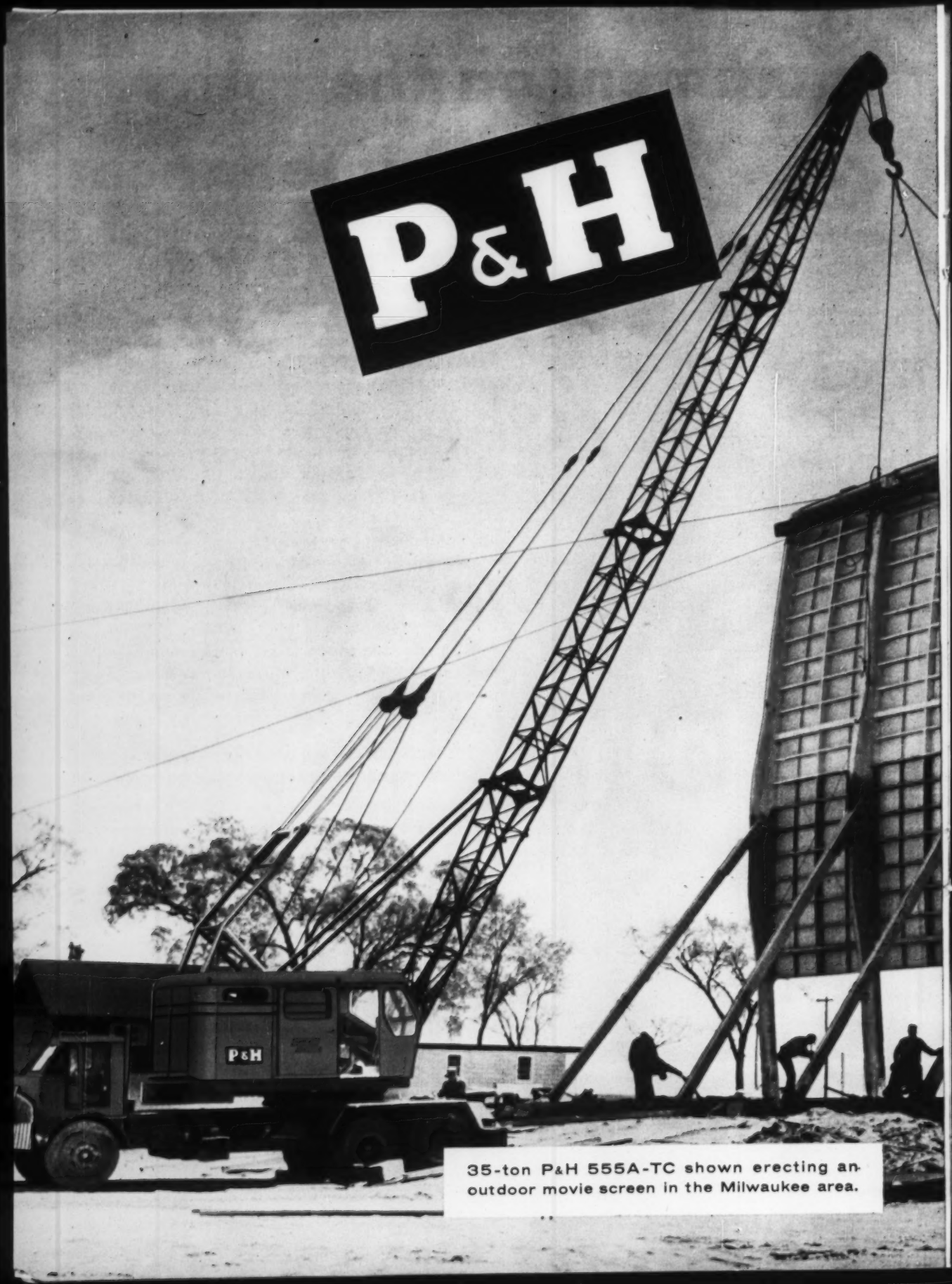
And don't forget: Texaco Universal Gear Lubricant EP for smoother-working transmissions and differentials—*Texaco Track Roll Lubricant* to fully protect and prolong the life of crawler mechanisms.

Let a Texaco Lubrication Engineer help you boost efficiency, cut maintenance costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT



35-ton P&H 555A-TC shown erecting an outdoor movie screen in the Milwaukee area.

Costs $89 a day...earns $160*

with 35-ton P&H "Job-Designed" Crane

In the 35-ton classification, there are more truck cranes with the familiar P&H trade mark than any other make—BY FAR! One reason for this unique acceptance is the fact that operators *know* P&H designs and builds both the upper and carrier expressly for 35-ton needs—giving owners a single source of responsibility.

An example of the P&H 555A-TC putting in more working days at a higher profit is the rig pictured at the left. Customers of the John Hennes Trucking Co., Milwaukee, Wis., keep this 555A-TC constantly on the go. Records show this machine costs $89.26 a day (depreciation excluded) to operate and it earns $160.

This profitable production is typical of P&H performance. It comes from such features as the P&H Planetary Boom Hoist. Lowering is always done under power and the boom can be safely held in any position. *The P&H Planetary Boom Hoist is a standard feature.*

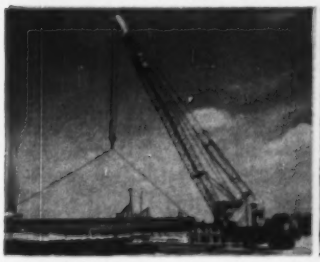
Another plus for P&H owners is the extra-strong booms supplied with the 555A-TC. Alloy steel and lattice construction makes these booms more rugged—and at the same time lighter. Goose-neck type, open-throat booms provide maximum boom load clearance.

Add to these exclusive features the famed P&H all-welded construction and live roller circle and you, too, will see why the P&H 555A-TC is the most popular truck crane in the 35-ton field. Call your P&H dealer. No matter what the capacity of your jobs, he can show you a P&H model to help you dig or lift more at a lower cost.

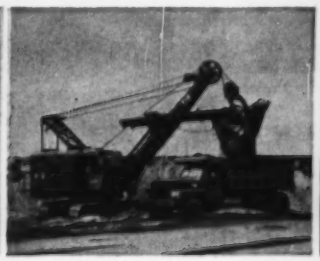
Harnischfeger Corporation
Construction & Mining Division
Milwaukee 46, Wisconsin

THE P&H LINE Truck Cranes: 8, 10, 15, 20, 25, 30, 35 and 40 tons
Shovels: ½, ¾, 1½, 1¾, 2½ and 3½ yards

Across the country P&H machines lead the field in power, speed, flexibility and profitable performance



TEXAS
For handling loads up to 20 tons profitably there is the P&H 255A-TC. Here is Brown & Root's third Model 255A-TC shown at work on construction of off-shore drilling platform at their Marine Division Shipyard.



CONNECTICUT
Earthmoving Service & Equip. Corp., profits from the greater strength of the 2½ yd. P&H 955A in moving tremendous quantities of borrow. Job is part of new Connecticut Turnpike.

VIRGINIA
In the ¾ yard class, Commonwealth Sand & Gravel Co. of Richmond depends on the speed and accuracy of the P&H 255A for increased production. It is shown here equipped with 40 foot boom and ¾ yard clamshell bucket.

***Write today for Verified P&H Cost-Performance Facts**

Harnischfeger Corporation, Dept. 502-A
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Gentlemen:
Please send me field report No. 5504 on the 35-ton P&H 555A-TC.

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*Title*_____

*Firm*_____

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*City*_____ *Zone*_____ *State*_____

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Reader Comment

Rail Pile Information Is Requested

SIR—I read with interest the article on Page 65 of your January 10, 1957 issue describing rail piles.

You make the statement in this article that "although the rail pile has never before been available to contractors, Engineers of the Southern Pacific Railroad Company in the early 1930's developed a triangular three rail pile."

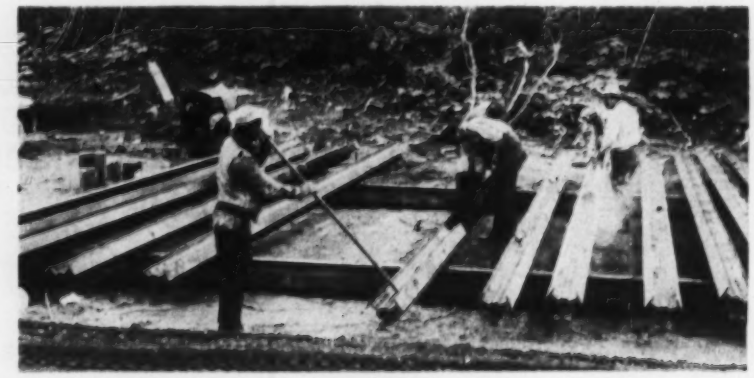
I recall bidding on work with the Alaska Road Commission five or six years ago where rail piles were made available by the road commission. I have also bid on work with the road commission where the rails were made available and where the specifications provided for the fabrication of these rails into a triangular pile.

Just how long the road commission has been using these pilings, I do not know but I am quite sure that it has been for many years. I believe that the Alaska Road Commission has found rail piles to be economically preferable to H-beam piling due to the high transportation costs to Alaska and also that there is a considerable quantity of light rail available at scrap prices.

I believe it would be an interesting sequel to your article to learn just to what extent these pilings have been used in the territory.

L. W. HUNCKE
President
Wm. A. Smith Contracting Co., Inc.
Kansas City, Kan.

[EDITOR'S NOTE—ENR editors began an investigation of the use of rail piles in Alaska, but before any answers were received, an ENR reader in Juneau independently provided the following information and pictures.]



THREE-RAIL PILES are prepared for installation on Alaskan highway project.

Rail Pile Information Is Delivered

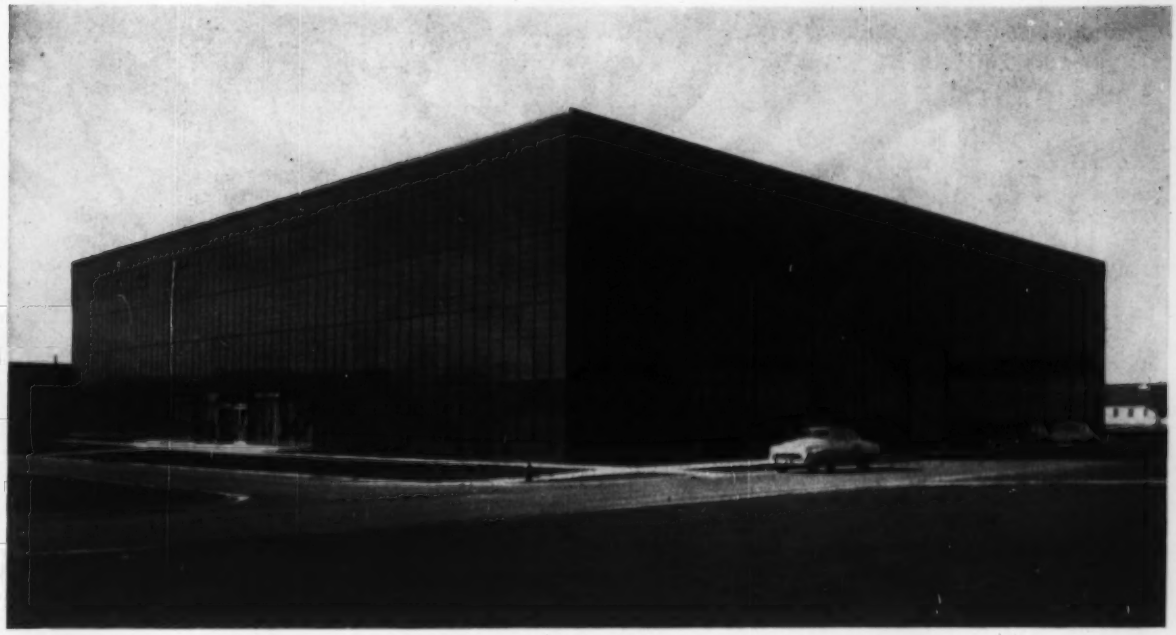
SIR—I am sure that all highway engineers and bridge contractors in Alaska read with considerable interest the article on rail piles on page 65 of your January 10th issue. Practically all of these men have been familiar since 1949 with the use of this type of pile on bridge work in the Territory of Alaska.

In that year, the Alaska Railroad began modernizing their main line from Seward to Fairbanks by replacing the existing 70 lb rails. Inasmuch as 1949 was a period of steel shortage, with H-piles difficult to obtain, both the Alaska Division of the Bureau of Public Roads, with Hugh A. Stoddard as Division Engineer, and the Alaska Road Commission, headed by the late General John R. Noyes, obtained permission to use these rails for pile purposes rather than have them take their costly way back to the mills as scrap.

The first use of these rail welded piles was in 1949 by the Bureau of Public Roads in several bridges on the Seward-Anchorage Highway. These were the first of some twelve bridges on that highway using this type of pile. In 1950, the Alaska Road Commission used welded three-rail piles for the Savage River Bridge in Mt. McKinley National Park, and in 1951 for two modern bridges in the City of Fairbanks.

Since that time the Bureau of Public Roads (responsible for road building in the national forest areas) and the greatly expanded Alaska Road

(*Continued on page 13*)



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L O F GLASS

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What's more, Roebling Royal Blue is *stronger* than the strongest wire rope previously available. It will do more work and last longer on *your* job. Call your distributor or your nearest Roebling office for full information about Royal Blue, the really better wire rope. John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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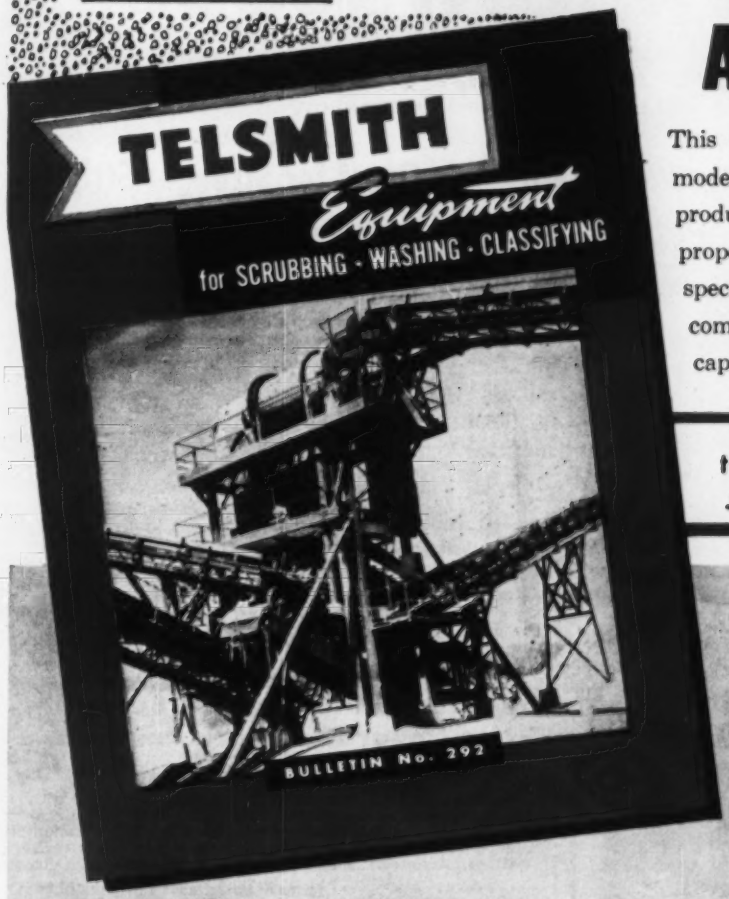
HOW TO PRODUCE TOP-QUALITY AGGREGATES



This new 20-page bulletin shows the most modern and most efficient machinery for producing top-quality aggregates of the proper gradation to meet the most strict specifications. Helpful pictures, tables and complete information including sizes and capacities.

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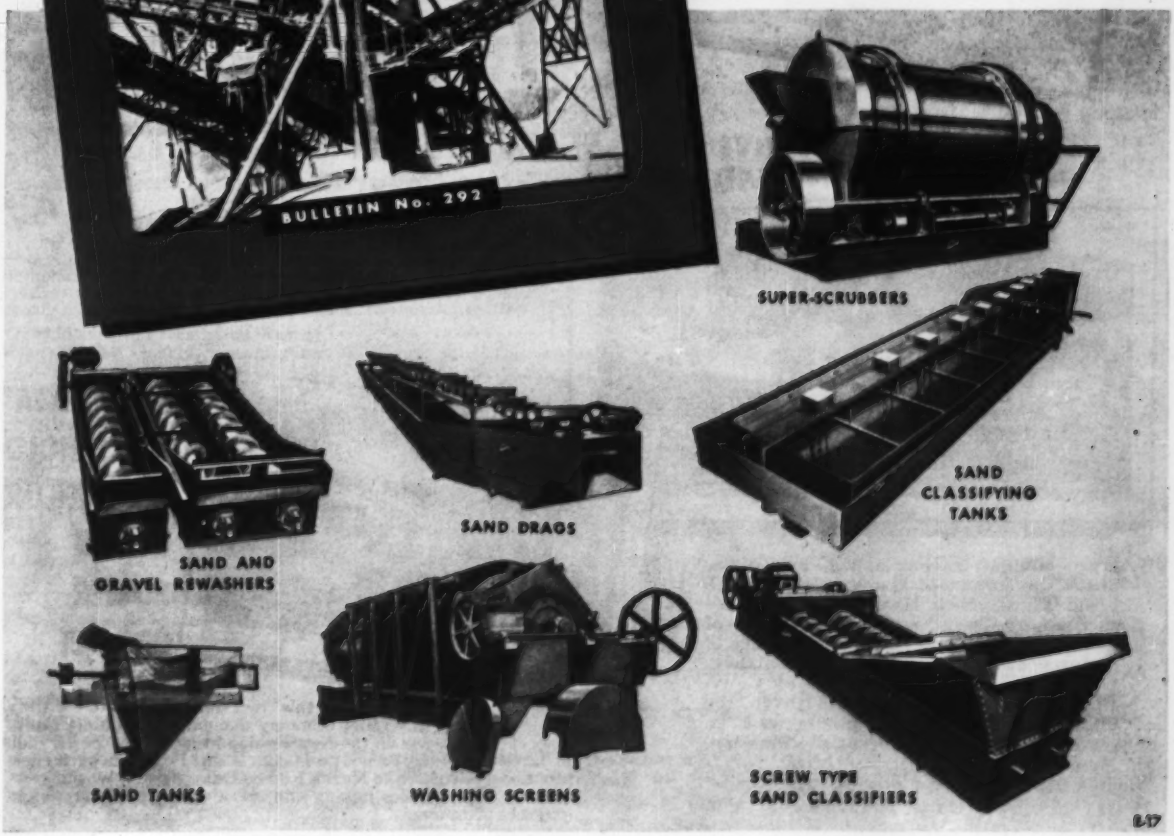

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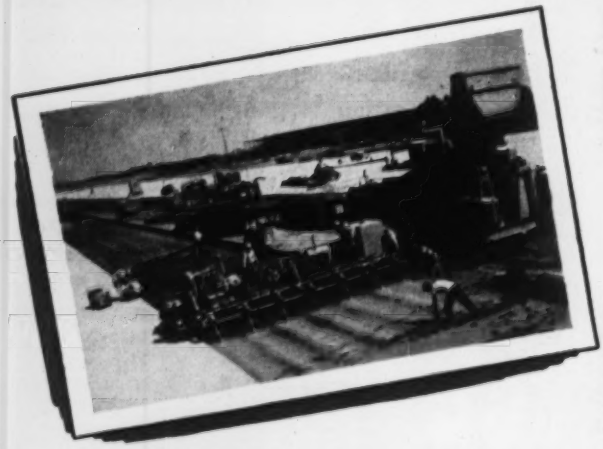
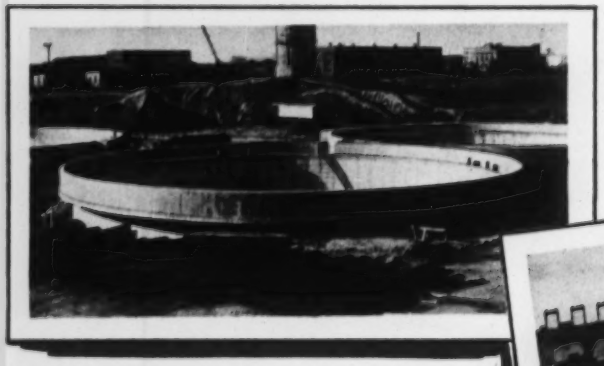
Air Bubbles Give "Concrete Answer" In Airmen's Quest for Stronger Strips

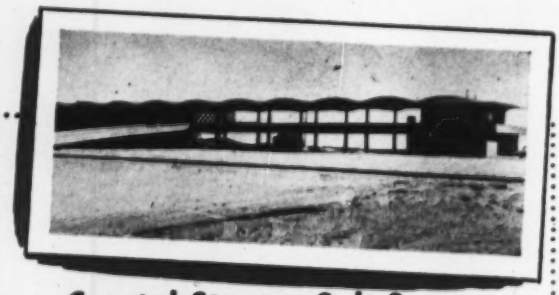


Billions of air bubbles, entrained in the thick concrete slabs of Portsmouth (N.H.) Air Force Base giant aprons and runways, proved the answer to stresses of frost and other winter weather factors in this major project, constructed by Morrison-Knudson Co. DAREX AEA, selected as the air-entraining agent, helps keep a smooth, unbroken surface for today's multi-ton planes. Job was completed in 1956, under supervision of Corps of Engineers, U.S. Army.

ENTRAINMENT EFFECTIVENESS PROVED IN SEVEN-YEAR TEST

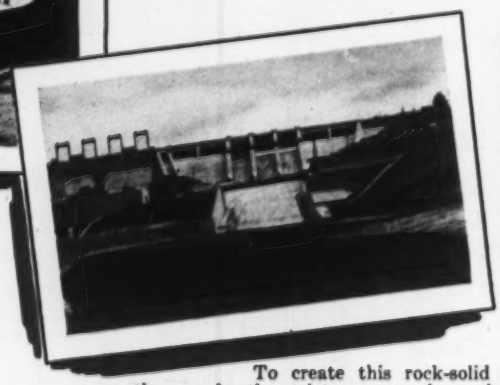


Huge circular settling tanks, buried beneath the surface at the East Shore Disposal Plant, New Haven, Conn., have successfully "weathered" seven years of freezing and thawing, show no evidence of disintegration through chemical attack. Constructed of poured concrete by C. W. Blakesley & Sons Co. of New Haven, the underground tanks were pronounced "in perfect condition" on recent examination.



Coastal Storms, Salt Spray No Hazard to Beach Pavilion

Project of Metropolitan District Commission, this ultra-modern bathing pavilion at Salisbury; Mass. used DAREX AEA to insure against deterioration from salt spray, rough weather. Architects: Coletti Bros., Boston; engineers: Ebasco Services of N. Y. DAREX AEA is credited with keeping costs of poured concrete structure at minimum by maintaining yields, providing easy placement.



DAREX AEA HELPS HOLD COST CEILING IN N.E. POWER PROJECT

To create this rock-solid structure—with a weather eye for the strict economy demanded by public utility projects—engineers on the New England Electric Co. power dam at Littleton, N. H. turned to DAREX AEA. Proved in such enormous operations as the Noxon Rapids Dam, Noxon, Washington, DAREX AEA reduces flaking and cracking, resists internal and external pressures.

DEWEY AND ALMY CHEMICAL COMPANY

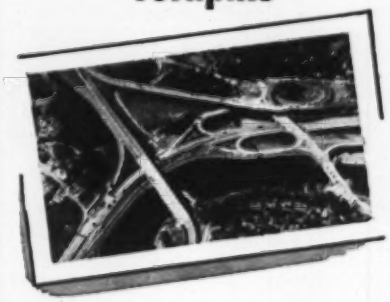
Construction Specialties Division

DIVISION OF W. R. GRACE & CO.

Cambridge 40, Mass.
San Leandro, Calif.
Montreal 32, Canada

DAREX
Newscope Feature

DAREX Products Offer Dual Safety On Massachusetts Turnpike



"Masterpiece of engineering—miracle of construction!"

Helping perform these construction miracles on the East-West Toll Road across Massachusetts are two products of Dewey and Almy research—DAREX AEA to add years of life to bridge columns and other vital concrete sections — DARACONE to protect bridge abutments from water and preserve their strength against deterioration from the action of de-icing salts.

The looping interchange at Weston, Mass. (*above*) clearly demonstrates the importance of bridges on this 123-mile project. There are 181 in all, between the coast and the Berkshires —every one of them made stronger, longer-lasting by this time-tested team!

Both products were selected by the engineers on the job; both are valued equally by the construction men behind this "Better Roads" project.

Wherever the job, DAREX AEA and DARACONE provide dual safety — assurance of success in construction, assurance of durability in use!

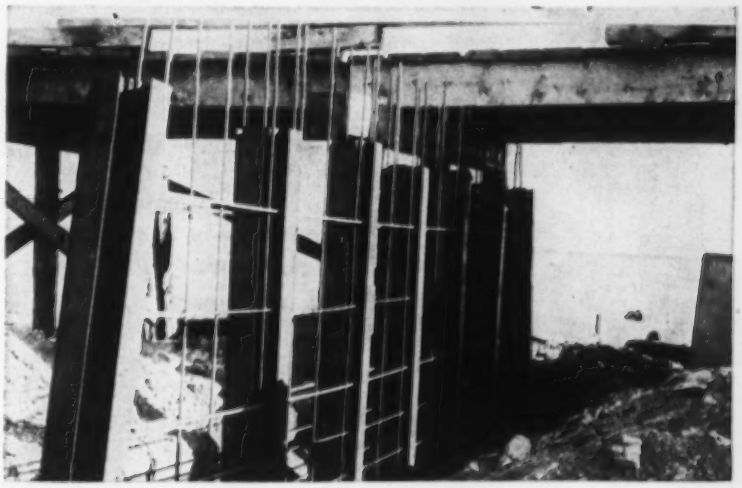
Other Dewey and Almy Products for the Concrete Industry

DARALITE—Air-entraining agent for use with lightweight aggregates

DARASEAL—Premium quality concrete curing compound

DARAWELD—For bonding new concrete to old

DEWEY AND ALMY
CHEMICAL COMPANY
DIVISION OF W. R. GRACE & CO.



Holes burned in four-rail piles simplify placement of reinforcing steel.

Commission (responsible for building all other roads in the Territory until taken over by the BPR in September of last year) have used many thousand feet of rail in the form of welded two, three or four-rail piles. One 1954 project alone, that of a 16 mile section of the Copper River Highway some 30 miles out of Cordova, made use of about 100,000 lineal feet of 70 lb rail.

Two-rail piles are usually used with cover plates when a large section modulus is required, and four-rail piles, with the rails welded at 90 deg, are normally used in piers where stream condition require use of a concrete diaphragm. Three-rail piles, with the rails welded at 120 deg with each other, are the most satisfactory for normal pile use and thus are the most used type.

In all types, the piles are fabricated by welding the rails head to head with the base flanges out, thus obtaining a very strong and stiff pile. The three-rail pile most efficiently provides the desired approximately equal moment of inertia in all directions, and has proved much more satisfactory for driving in bouldery material and frozen soil than the conventional H-pile. Rail piles are driven both with a steam hammer of the required size or a heavy drop hammer.

Rail piles are fabricated by welding each contact surface with ⅝x6 in. intermittent welds at 2 ft centers except that at the ends the welds are closed up to provide about a 2 ft continuous length. This welding is usually done at the bridge site and considerable progress has been made in welding technique since the initial use in 1949 of these high carbon rails. In fact, the use of this type of pile has been sufficiently wide-spread to provide one welding concern a major business activity subcontracting this specialized welding.

Splices may be made in the leads at a pile section by butt welding and use of splice plates on each rail flange. Piles are usually fabricated before driving in the normal 33 ft lengths or in longer lengths by butt welding single component rails at staggered splice points in the built-up pile.

Care must be taken in driving, particularly when using a drop hammer without fully fixed leads, as eccentric blows on a swaying pile tend to cause weld and rail breakage.

Even under normal conditions, some breakage is experienced both in the pile and the welds. Individual rails, previously damaged by railroad traffic will break on occasion under hard driving. All breaks such as these are repaired by field welding with the pile in the leads.

Rail piles are used as both friction and end bearing piles. We specify and obtain bearings in friction piles of up to 25 ton for three-rail piles. These bearings are checked by the ENGINEERING NEWS formula and at different times have been verified by test loadings. Experience has shown that the bridge contractor will haul, fabricate and drive these piles at a considerable saving in cost over the price bid for furnishing, transporting and driving steel H-pile. In addition, the use of these old rails reduces by that amount the requirements for new steel.

R. J. DELAHUNT
Supervising Highway Construction Engineer
Bureau of Public Roads
Juneau, Alaska

(*Reader Comment continued on p. 20*)

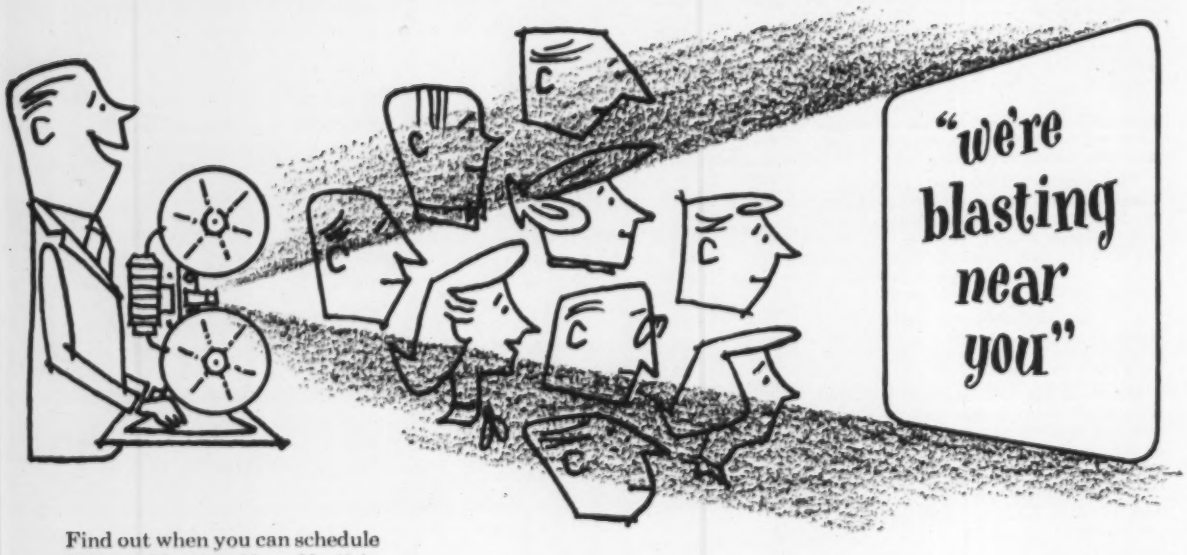
Here's a new, effective way to aid your public relations in the communities where you are blasting. It's the interesting, informative sound film in color, entitled, "*We're Blasting Near You.*"

This movie tells why blasting is necessary, and the steps you are taking to be a "good neighbor." It shows how millisecond delay techniques eliminate the old fashioned, jarring explosions of the past . . . how modern blasting methods hold noise to a muffled minimum and make vibration unnoticeable.

"*We're Blasting Near You*" can be shown to any age group: schools, service clubs, civic organizations. It is accompanied by a kit which includes suggested news releases, a sample introductory speech for the person presenting it as well as safety posters, and other helpful material. Show this unique new movie in your area. It can be an important help to you.

New film...

builds goodwill for users of explosives



Find out when you can schedule "*We're Blasting Near You*" in your community. And ask for "*Better Blasting,*" the Atlas newsletter on latest methods and materials.

Technical Customer Service Section

ATLAS POWDER COMPANY

WILMINGTON 99, DELAWARE

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The New UNIT Model 510 Challenger ... as a Trenchoe

DESIGNED with a BACKGROUND of 3/8 YARD EXPERIENCE

Evidence of highest quality engineering and construction includes alloy steels and forgings • anti-friction bearings • modern transmission design with involute splines to add strength and reduce wear • straight-in-line engine mounting with torque converter • trunnion supported tapered drums to eliminate bending stress on drive shafts • easily accessible hydraulic clutches • minimum number of main machinery gears enclosed in one-piece cast gear case • force feed lubrication • self-aligning replaceable hook shoes distribute applied pressure over maximum area • interchangeability of parts simplifies maintenance, cuts costs. All these UNIT advantages mean more profitable operations for you.

Why it's BEST *to* INVEST *in modern* UNIT *models*

Because each feature has been proven to contribute substantially to the Life, Performance and Efficiency which have made present and previous UNIT products readily acceptable.

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HIGH RE-USE FACTOR MAKES THIS MIRACLE OVERLAID FIR PLYWOOD YOUR IDEAL MATERIAL...

Forty re-uses—not unusual for Harborite—will cut your cost to less than 1¢ per poured surface foot... and contractors have reported over 100 re-uses for forms made of Harborite! Rigid, abrasion-resistant Harborite panels produce glass-smooth concrete... joints and fins are cut to a minimum... stripping is easier, faster! The super-smooth Harborite overlay will not run, bleed or discolor concrete... it has a special affinity for oil and other form finishes. Available in oversize panels and standard 4′ x 8′ size... in any thickness.

WITH HARBORITE YOU GET MIRROR-SMOOTH SURFACES... FASTER STRIPPING... MINIMUM FINISHING... AND LOWEST COST TOO!

FIGURE YOUR OWN SAVINGS!

	PLYFORM	HARBORITE	MATERIAL YOU NOW USE
WAREHOUSE COST PER FOOT*	$.242	$.308	
AVERAGE NUMBER OF RE-USES	10	40	
COST PER POURED SURFACE FOOT	$.0242	$.0077	

*Prices vary in different areas.

INDIANAPOLIS • JACKSONVILLE • LOS ANGELES • SAN FRANCISCO • SEATTLE • TAMPA • *other major cities*

Breaker Parts by AMSCO®
Cut Costs Where It Counts

Impeller Bars, Breaker Bars and Liner Plates of extra tough Amsco Manganese Steel reduce wearing action.

The violent breaking action of primary rock, the high-speed impact of stone thrown by impeller bars against breaker bars and liner plates, give this breaker a terrific pounding. These parts are designed for minimum wear with Amsco Manganese Steel . . . in this heavy-duty "Cedarapids" Model 5360H Impact Breaker, produced by Iowa Manufacturing Company.

Amsco Manganese Steel crusher parts, made of "the toughest steel known", give a much longer life span to these main wear points. This extra-tough steel work-hardens under impact. Abrasion polishes manganese steel, and yet it retains high-ductility qualities.

Breaker parts by Amsco *cut costs where it counts* . . . by reducing parts-replacement time to a minimum, and by giving much longer service life between repair periods.

Amsco makes manganese steel breaker parts for most major manufacturers of crushing, grinding and pulverizing equipment. Call your manufacturer's representative for further information on Amsco breaker parts.

AMERICAN Brake Shoe COMPANY

AMSCO

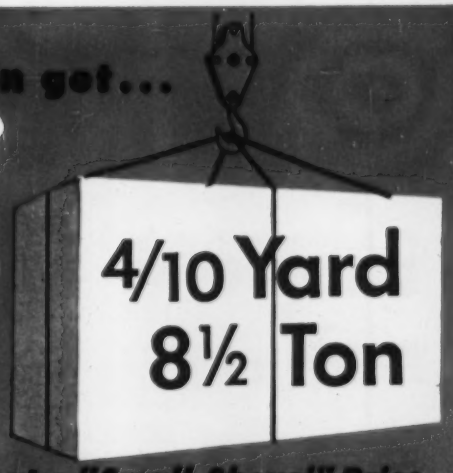
American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS; JOLIETTE, QUEBEC

Why take less when you can get...

MORE!

MORE Big Shovel Features
MORE Capacity
MORE Work and Profits



at a "Small Shovel" Price

With the all new 4/10 Yard 8½ ton 85A "QUICK-WAY"®

When you can make money with a small outfit, think how much more money you can make with the husky "QUICK-WAY" 85A. Why be satisfied with a 6 or 7 tons in the ⅜ yard class when you can get 8½ tons in the 4/10 yard "QUICK-WAY" 85A—and for approximately the same price.

The new "QUICK-WAY" 85A has more Big Shovel Features than any other in the small shovel field. It has been engineered to meet rugged, heavy-duty specifications with fewer moving parts. The power train is oversize, all shafts are splined for easy maintenance. Extra strength has been built in the machinery frame and gantry for greater lifting power. It has been simplified for easy, economical maintenance of all parts. It operates smoothly and quietly with maximum production and minimum operator fatigue.

The All New "QUICK-WAY" Crawlers 85AC and 105AC

Now you can get the "QUICK-WAY" 85A and 105A on a crawler! You get the same "QUICK-WAY" Big Shovel Features on the crawler that gets to its job easily, stays with the work, even in close, restrictive quarters. The new "QUICK-WAY" Crawler has independent travel—forward and reverse speeds of ⅞ miles per hour in low range and 1¼ miles per hour in high range. It is now available in 16" crawler shoes (5.1 psi ground pressure), 24" crawler shoes (3.5 psi ground pressure), and 32" crawler shoes (2.5 psi ground pressure). Width of 95" has been especially designed for hauling on trailers.

• The Most Complete Line in the Small Shovel Field with 5 Models—105A 5/10 yd., 10½ Tons—105AC 5/10 yd., 7 tons —125A 6/10 yd., 12½ Tons—with the famous money-making line of "QUICK-WAY" attachments for all models.

1 SIMPLIFIED CHAIN AND GEAR DRIVE for efficient, quiet operation—the combination of roller chains and precision machined gears gives efficient transmission of power through the minimum number of moving parts. Standard engine 47HP @ 1800 rpm.

2 MAIN HOIST AND HAUL BACK DRUMS are mounted on a single, accessible shaft with sealed antifriction bearings. Two-piece cast laggings are easily changed. Large clutch and brake drums have separated surfaces with louvres for cooling.

3 LARGE SWING DRUMS are ribbed for cooling and are mounted on a king-sized horizontal swing shaft. Vertical swing shaft is mounted in double anti-friction bearings at top with an anti-friction needle roller bearing at bottom. One-piece, bonded brake linings provide more surface for smoother, cooler operation.

4 OVERSIZE CLUTCHES have more surface—for smoother, positive action. Hydraulically operated for easy, sure application of power, giving the operator the feel of the load at all times.

5 POWER UP AND DOWN BOOM HOIST IS STANDARD. Simple precision design makes safe, sure operation. A one-piece cast steel unit contains pawl teeth, windlass and brake drum. The cable end is located in an easily accessible place for quick attachment change-over.

6 ONE-PIECE FLOOR FRAME, HEAVY DUTY SWING TABLE GEAR AND HOOK ROLLERS— Floor frame electric welded in jig, then all bearing mounts machined at one time for precision alignment. One-piece, cast steel swing table gear. Four hook rollers distribute load.

7 ALL SHAFTS SPLINED, ALL ANTI-FRICTION BEARINGS— All shafts extra large for maximum strength, precision splined for easy maintenance. Anti-friction bearings used on all high-speed, continuous rotating shafts and drums. All shaft bearing surfaces are precision ground.

8 MACHINERY HOUSING DESIGNED FOR COMPLETE, EASY ACCESS to all machinery. New feature is an automobile hood-type cable trough cover that lifts high for complete access to central machinery. New cab has 360° vision through removable safety-glass windows.

"QUICK-WAY" TRUCK SHOVEL CO. • DENVER, COLO. Koehring Subsidiary

GET THESE IMPORTANT BOOKS . . . FREE!

- ☐ The new catalog on the "QUICK-WAY" 85A and 85AC Crawler.
- ☐ The new catalog on the "QUICK-WAY" 105A and 105AC Crawler.
- ☐ The new catalog on the "QUICK-WAY" 125A.

"QUICK-WAY" TRUCK SHOVEL CO., Dept. 167
2401 East 40th Ave., Denver 5, Colorado, U.S.A.

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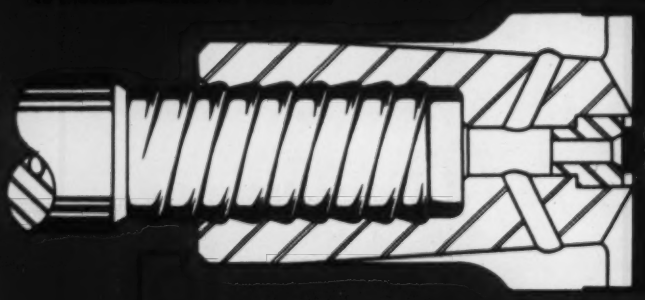
If You Want to Cut Drilling Costs . . .

TRY THIS BIT

Bottoming Type Bit Pioneered by V-R



Here is the longer-lasting percussion bit pioneered by V-R. The steel drives against the bottom of the bit body, not on the shoulder. The load is carried where the bit is strongest, reducing chance of ring-off, fatigue and thread damage.

Penetration is faster because the impact load is carried a short distance only. The long breakaway body design provides lots of clearance for fast drilling and easy extraction.

The exclusive V-R carbide inserts provide remarkable impact and abrasion resistance. A special "balance-brazing" technique prevents stresses that cause premature failure.

Here is a bit that will drill more on any job. Get complete facts.

19 sizes 1-9/16" through 5"

Superior Cemented Carbides for Over 20 Years

Ask for Catalog . . . *complete data on V-R bottoming type, shoulder type and push-on bits for all rock drilling jobs. Free on request. Write today.*

Manufacturers of cemented carbides and TANTUNG cast alloys

Vascoloy-Ramet Corporation

SUBSIDIARY OF FANSTEEL METALLURGICAL CORPORATION

864 Market Street • Waukegan, Illinois

M-610

. . . Reader Comment

Code Remiss on Web Steel

SIR—The design moments and shears of continuous reinforced concrete beams are determined by the use of the stiffness values in bending and torsion of the full concrete sections. The unavoidable cracking and changes in the concrete, which are functions of the time elapsed after pouring, may result in a ten times increase of the deflections computed by the use of full concrete sections.

During the change from the uncracked to the cracked and permanently deformed condition of the girders, the shear may increase and the ability of the concrete to take diagonal tension may disappear. With less than full-shear reinforcement, the propagation of diagonal cracks will not be checked sufficiently, the carrying capacity of the girders will be reduced, and abrupt changes in the deflections may also occur.

The new American Concrete Institute specifications require steel only for two-thirds of the computed shear to a point slightly beyond the inflection point. Test specimens and actual girders with less than full-shear reinforcement have failed in diagonal tension at either side of the points of inflection. Therefore, it is unreasonable to base an insufficient-shear-reinforcement requirement on the changing location of inflection points.

The computations locating these points are meaningless, in that they can neither save steel nor improve the carrying capacity of deficiently reinforced girders. Spending the office time they consume for the proper arrangement of the reinforcement would produce fully reinforced girders of maximum carrying capacity at minimum cost.

LOUIS BALOG
Consulting Engineer
Binghamton, N. Y.

Watershed Treatment

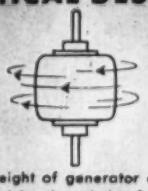
SIR—Your report "How to Reap Added Runoff" in your Jan. 10 issue (p. 39) startled me and probably many fellow engineers and conservationists. The "thinning" of forests and the removal of undergrowth and brush in a watershed is at best a short-range, stopgap measure. In the long run such drainboard treatment inevitably leads to soil erosion, fast siltation and loss of reservoir capacity, followed by serious climate deterioration. The drainboard treatment of a watershed for greater runoff simply does not follow the mathematics of hydraulics.

(*Continued on page 28*)

ANNOUNCING

the first major improvement in generator design in 25 years

REVOLUTIONARY VERTICAL DESIGN



Spins like a top

Entire weight of generator armature supported by the tubular frame. Engine and main bearing turn the armature—do not support it. Generator spins best on vertical axis—lasts longer.

OLD DESIGN

Generator weight exerts loads on engine shaft and bearings. Causes more wear than in Thor's vertical mounting.

New Thor generator powering a Thor 7¼" SpeedSaw hastens construction of the new Congress Street Expressway in Chicago.

ALL NEW

THOR PORTABLE GENERATOR

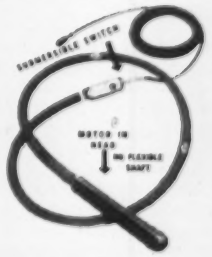
Here's the brand new look in generator design—Thor's all-new 1500 watt portable engine-driven generator with vertical mounting.

This handy, compact power plant—available in AC and DC models—is the real answer to the builder or contractor who needs a rugged, portable power source. Check these features, then check your Thor distributor for a demonstration. • **Revolutionary design—vertical shaft engine • Light weight—95 lbs. Strong tubular framework protects unit, assures handling ease. • Heavy duty automatic rewind starter—easily removable for repair. Off-on toggle-type switch. No shock danger • Drip-proof construction—keeps fuel and moisture from entering generator • No-creep—stays put while running, yet slides easily when moved.** Thor Power Tool Co., Prudential Plaza, Chicago 1, Ill.

Thor PORTABLE POWER TOOLS

ANOTHER FIRST FROM THOR

Universal Electric Motor-in-Head Concrete Vibrator



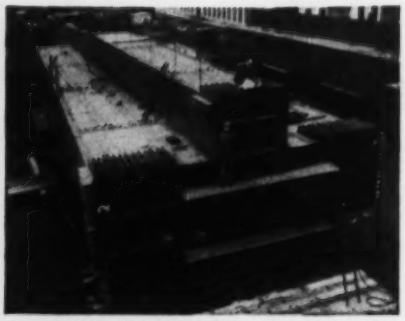
Model CV2-10 has 10-foot hose and switch • **Model CV2-20** has 20-foot hose and switch. • **Model CV2-210** has 10-foot hose on each end of switch. All models include 25-foot 3-conductor electric cable.

THOR POWER TOOL COMPANY
CHICAGO
Branches in all principal cities

Pittsburgh's X-L-O

STRUCTURAL STEEL PRIMER

Provides two-way protection for world's longest suspension bridge over Michigan's Mackinac Straits



One of the tower sections being assembled at Ambridge Plant of the American Bridge Division, United States Steel Corporation.

1. Safeguards steel shapes against corrosion during transit and erection

2. Makes an excellent foundation for field painting

A **70-YEAR** dream come true! That's the new five-mile bridge now being erected to link Michigan's upper and lower peninsulas. This huge project was designed by Dr. D. B. Steinman. The American Bridge Division, United States Steel Corporation, is fabricating the 75,000 tons of structural steel for its superstructure and major portions of the foundation caissons and cofferdams.

This giant project features a suspension bridge with a center span of 3,800 feet, two 1,800-foot side spans, and two 472-foot unloaded backstay spans. Total length, including anchorages, is 8,614 feet, making it the world's longest suspension bridge.

Structural shapes for this viaduct are shopcoated with Pittsburgh's X-L-O Primer to protect them against corrosion during storage, transit and erection. This remarkable finish eliminates need of costly metal cleaning. Its remarkable wetting characteristics assure uniform coverage even over surface irregularities caused by mill scale. Satisfactory through drying of film within twenty-four hours, regardless of weather, makes possible prompt shipment to job sites.

X-L-O Primer also serves as an excellent foundation for final coats. Pittsburgh's IRONHIDE and METALHIDE, in suitable colors, are available for field coating.

Why not call on us for advice or suggestions to protect structural steel on your jobs? Wire, write or phone Pittsburgh Plate Glass Company, Industrial Sales Division, 1 Gateway Center, Pittsburgh, Pa.

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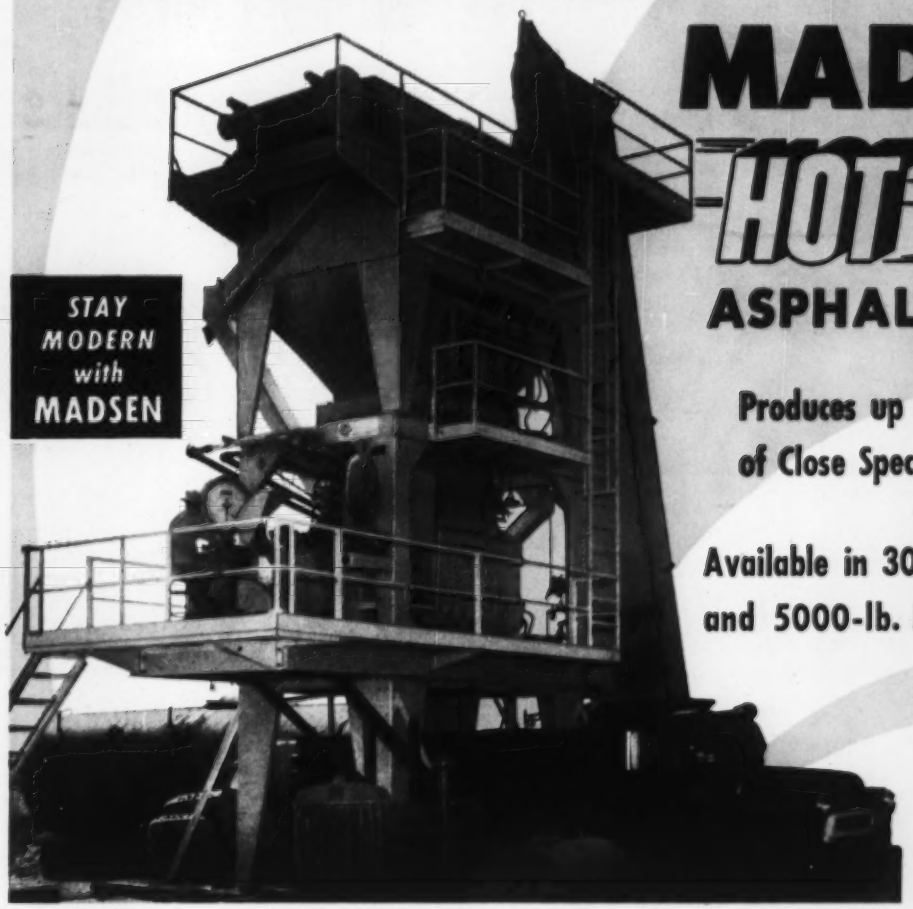
PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

Specially Designed for Today's Fast Moving ROAD BUILDING PROGRAM... the NEW MADSEN HOT-ROD ASPHALT PLANT



Produces up to 250 T.P.H. of Close Specification Mixes

Available in 3000-lb., 4000-lb. and 5000-lb. Batch Capacities

Whether you are a contractor who likes to move or the "get-set-and-stay-there" type of operator... the new MADSEN Model 391 HOT ROD Asphalt Plant is designed for you! This plant is extremely versatile... capable of delivering maximum daily tonnage of top grade bituminous mix under today's exacting specifications. The HOT ROD has a minimum of removable parts for transport and sets up quickly. It is streamlined in design, has no "excess baggage", and it is one of the easiest-to-operate asphalt plants in the industry. Some of the outstanding features of this new MADSEN Model 391 HOT ROD Asphalt Plant are shown below... check them—then ask your MADSEN Distributor for complete details and engineering specifications.

- New fully-enclosed (running in oil) gear box reduction unit that goes right to the mixer shafts... eliminates exposed mixer timing gears.
- Famous MADSEN Twin-Shaft Pug Mill Mixer (Patented) with externally removable sectional liners, improved mixing action and faster discharge.
- Simplest, cleanest design in the industry... with a minimum of removable parts for easy transport and fast set-up.
- MADSEN Asphalt Pressure Injection System with new rotating distribution bar (Patented)... injects the asphalt into the mill quickly—cuts it off sharply to give you improved mixing and reduced mixing time.
- Operator station on end of plant... with swivel-head asphalt and aggregate scales and all controls conveniently located for easy fatigue-lessening plant operation.
- Fast air operation of bin gates, asphalt pressure injection system and mixer gate.
- Exclusive bin design (Patent Pending) eliminates segregation.

MADSEN Equipment that Serves

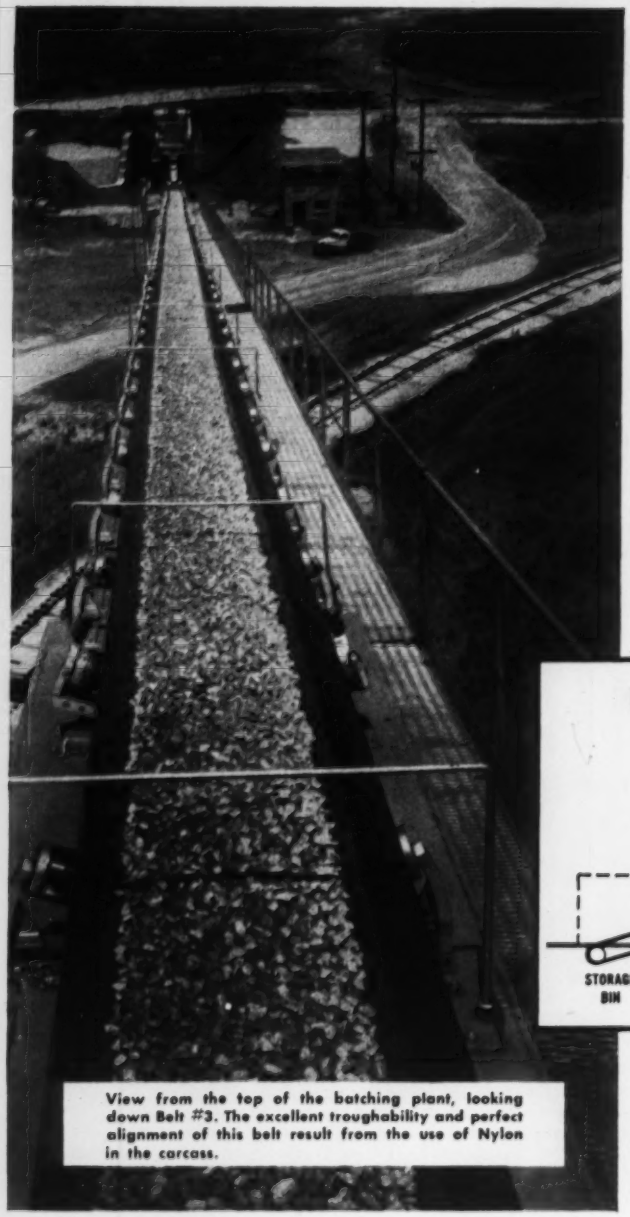
Ask your MADSEN Distributor for Catalog No. 391, or write MADSEN WORKS, Baldwin-Lima-Hamilton Corporation, P. O. Box 38, La Mirada, California

THE MADSEN LINE OF PRODUCTS FOR THE ASPHALT PAVING INDUSTRY INCLUDES

ASPHALT PAVING PLANTS • PUG MILL MIXERS • AGGREGATE DRYERS • DUST COLLECTOR UNITS
ROAD PUG TRAVEL-MIX PLANTS • WEIGH BATCHERS • SUPER FLOAT AND JOHNSON FLOAT FINISHERS
ASPHALT TANKS • ROYAL CROWN PUMP VALVES • ASPHALT AND FUEL PUMP UNITS

BALDWIN BLH LIMA-HAMILTON

MADSEN WORKS
BALDWIN-LIMA-HAMILTON
CONSTRUCTION EQUIPMENT DIVISION
DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation • Hamilton • Lima • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

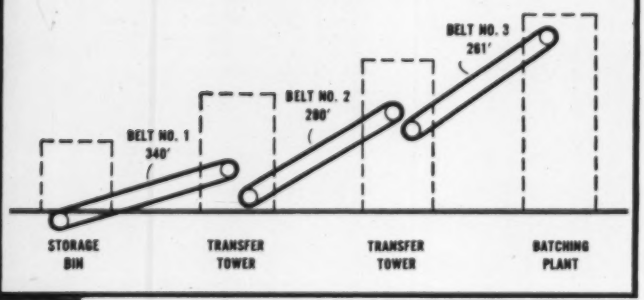


View from the top of the batching plant, looking down Belt #3. The excellent troughability and perfect alignment of this belt result from the use of Nylon in the carcass.

US RUBBER CONVEYOR BELTS

Push-Button Control and U.S. Conveyor Belts help turn out 120 cu. yds. of concrete per hour

FLOW CHART OF CONVEYOR BELT SYSTEM.



"This is the largest concrete plant* of its type in the world," says the plant's manager. "In aiming to turn out the best concrete at the lowest possible cost we require a highly mechanized operation."

And that's what this plant has. Almost 2,000 feet of U.S. Rubber's 30" wide U.S. Matchless patented Style XN conveyor belting carries raw materials through the reclaiming tunnel, then up a steep grade to a turn head—electrically controlled—and finally discharges the cargo into the always-hungry jaws of the huge batching plant.

One man in a control tower oversees the entire operation, from storage pits to plant bins. The control board tells him when a bin is getting low. By pressing a button he can start one of the three U. S. Belts hauling sand, stone, or other aggregates to the proper bin. "We expect many years' service from these belts," adds the plant's president, J. Roy "Cap'n" Pennell.

This is another good example of U. S. Rubber's Three-Way Engineering, in which "U. S." engineers work as a team with the plant engineers and the conveyor system engineers . . . to obtain the *right* belt for the job. This type of assistance, plus a complete line of conveyor belting, can be obtained at any of our 28 District Sales Offices, or contact us at Rockefeller Center, New York 20, New York.

In Canada, Dominion Rubber Co., Ltd.

*Greenville Concrete Co., Greenville, S. C.

Mechanical Goods Division

United States Rubber

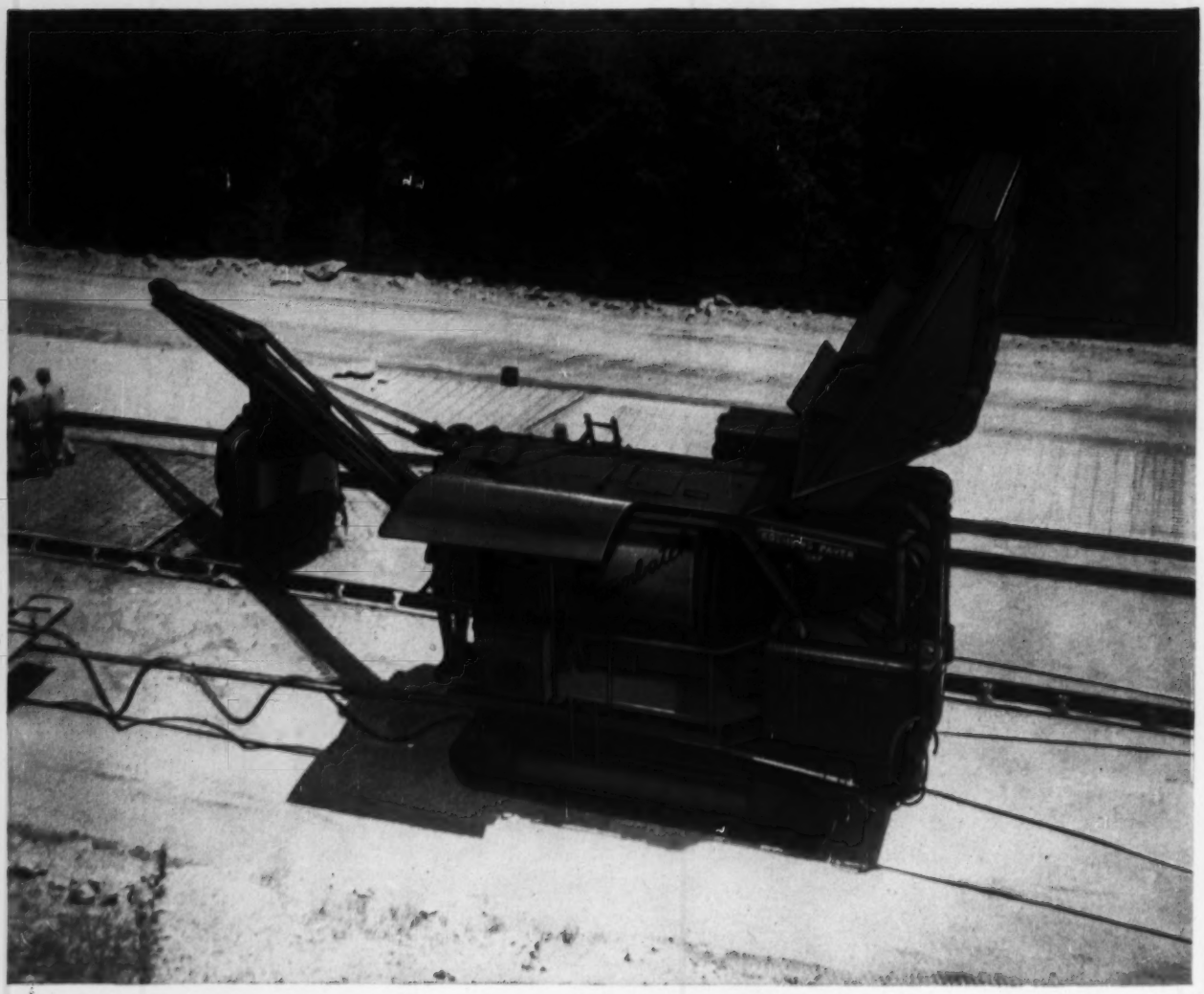
ROLL UP PRODUCTION *with help like this . . .*

- **EXCLUSIVE "ROLL-AWAY" MOLDBOARD . . . moves tough dirt fast**
- **NEW TOGGLE-TYPE CONTROL . . . kick-free in the rough . . . pinpoint accuracy at the blue-tops**
- **HIGHEST AXLE AND THROAT CLEARANCE in its class . . . for better handling of biggest loads**
- **TOUGH TUBULAR FRAME . . . shock-absorbing strength down the middle**
- **BOX-SEAT COMFORT AND VISIBILITY . . . satisfied operators . . . more and better work done on all grading jobs**

ROLL-AWAY is an Allis-Chalmers trademark.

These are five of many reasons why Allis-Chalmers FORTY FIVE motor graders are showing up in more and more top construction organizations. They're precisely what you dirt-moving specialists ordered . . . ready now to help you handle the big road-building years ahead. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*



Pouring concrete in strips 12 feet wide on a new expressway, Koehring 34-E *twinbatch* paver averaged 1100 feet per 8-hour day. 10-inch slab consisted of 8-inch mesh-reinforced base, 2-inch top course.

PLAN YOUR SPREAD FOR

the heavy paving program ahead

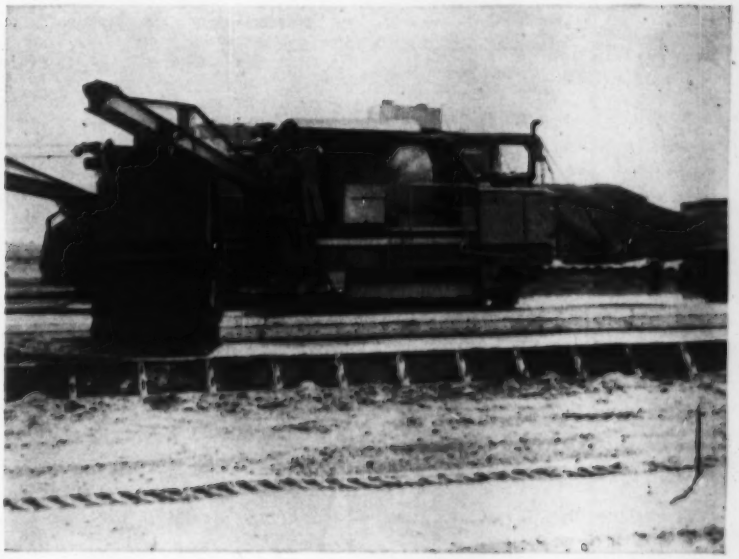
Long-range outlook on the extensive road program, and new "jet-age" airbases, indicates a steadily-rising curve of construction activity in all areas. It also indicates plenty of paving business ahead for the contractor who is in a position to compete favorably in the bidding, and who can profitably complete contracts *on schedule.*

In planning your equipment spread, you can't afford to gamble on the production end of your job — *at the paver,* where every second counts. That's where the *reserve* production capacity of a Koehring 34-E *twinbatch*® protects your schedules and profits. It hits a top output of 86.7 batches an hour, on 60-second mixing cycle. This lets you pick up any lost time, when you need it, to offset normal job and material delays — maintain a high *average* speed throughout duration of the job — keep batch plant, trucks and finishers working at peak efficiency. With *twinbatch* Autocycle control, every mixing operation is automatic, accurate, and fast. Drum charging, mixing, transfer and discharge are all synchronized by Koehring Batchmeter, a simple timing device. 8-second skip-hoist speeds charging. Big, double-door bucket and wide-swinging boom speed concrete distribution on the grade. What's more, accessibility of every paver maintenance point, plus heavy-duty construction, all help to keep paving jobs rolling *on schedule.*

You'll find there's no substitute for the steady output, speed and economy you can get with 34-E *twinbatch* pavers on your big-production highway and airport contracts. Talk it over with your Koehring distributor. He has more information that will interest you. Why not call him *today?*

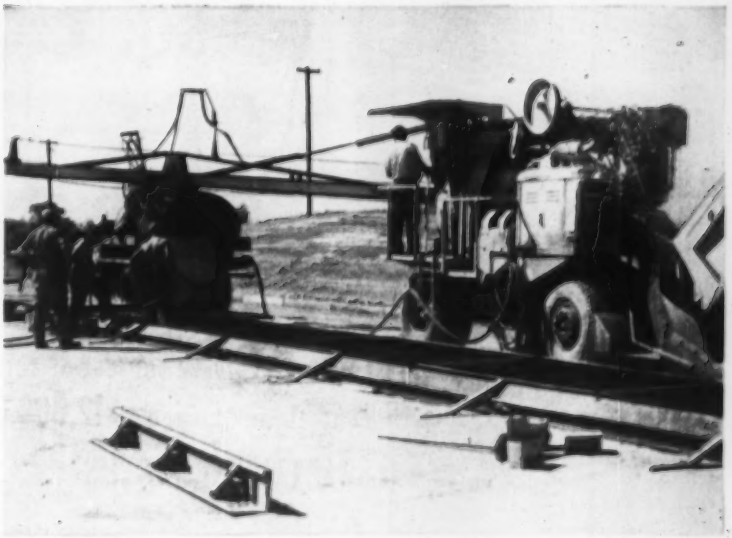
34-E *twinbatch* team works side-by-side on big U. S. airbase

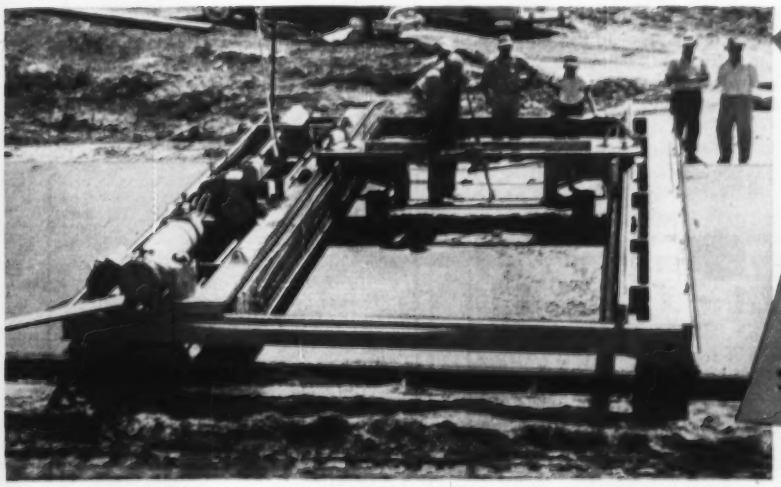
Widening runways on a military airstrip, contractor completed job "on the double" with a pair of big Koehring 34-E *twinbatch* pavers. Notice how one long-boom 34-E poured the outside half, while the other poured the inside half of the strip. For balanced, high rate of production at *both ends* of the job, many contractors team up *twinbatch* pavers with C. S. Johnson automatic batch plants (another Koehring product worth checking). Clamshell cranes, finishers also available in big Koehring paving "package".



Mobile 16-E paves center-strips, intersections, bridge-approaches

On street and highway jobs, there's always extra concrete to be laid in addition to the main slab, such as curbs, gutters, center-strips, scattered intersections, approaches to driveways, bridges and side-roads. Consider the time-saving flexibility you can get with a rubber-tired *twinbatch* in your paving spread. This Koehring 16-E is as mobile as your batch trucks — can get back on the new slab *in as little as 7 days* to do clean-up work, or pave adjoining strips. Also has high elevated discharge, pours into overhead hoppers, forms, chutes. You'll find its usefulness unlimited as a utility unit . . . or as a general-purpose paver.





"Timely" precision-finishing —

is important on every paving job. Operating at almost twice the speed of a 34-E paver, Koehring Longitudinal Finisher handles all practical consistencies of concrete — harsh, wet or dry — produces smooth, mechanically-accurate slab with uniform crown transitions.

K759

Georgia Pacific Plywood Company
270 Park Avenue
New York, New York

Gentlemen:

The Stateway Gardens Project consists of six 17-story and two 10-story apartment buildings. The calls for 1,300,000 sq. ft. reinforced concrete ceilings and 1,200,000 sq. ft. reinforced concrete walls, for which we plan on using 160,000 sq. ft. of GPX plastic coated concrete form plywood manufactured by the Georgia Pacific Plywood Company. The buildings, designed by Holabird & Root & Burgee, are unique, in that no columns or beams are used. The concrete walls constitute the supporting members.

Experience has proved to us that the many re-uses we get from GPX far exceeds what we might get with another form material. In addition, the smooth, uniform, concrete surface requires a minimum of pointing and no further finishing. The concrete surfaces will be painted, thus eliminating a costly plaster job.

GPX thus affords us a considerable economic savings in addition to the many other advantages.

Very truly yours,

JAMES McHUGH CONSTRUCTION CO.
C. E. YOUNGDAHL & COMPANY

D. W. Rensford

DWR:ms

1 sq. ft. of GPX concrete form

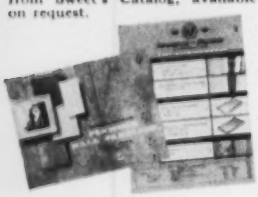
covered every 17 sq. feet of surface concrete in Chicago's **$12,000,000 STATEWAY GARDENS**

Between State Street and the New York Central Railroad, from 35th to 39th Streets, a city within a city is rising. Stateway Gardens, with its parks, apartments and schools, will bring a better way of living to hundreds of Chicago families. It is a story of architecture, engineering and concrete. Concrete poured, stripped and poured again in the same lightweight, plastic-surfaced plywood forms. GPX Concrete Form was reused here 17 times and the same handy panels will serve many future assignments, each resulting in smo-o-o-th concrete, requiring little or no finishing.

Unretouched closeup of wall shows concrete condition immediately after stripping away forms. GPX Concrete Form absorbs practically no water, strips easily.

Send for literature: GPX CONCRETE FORM

Booklets including 8-page section on specialty plywoods, reprinted from Sweet's Catalog, available on request.



GEORGIA—PACIFIC
CORPORATION

60 East 42nd Street, New York 17, N. Y.
Please send me free literature on GPX Concrete Form.

NAME_____
ORGANIZATION_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

. . . Reader Comment

There may be greater runoff at the outset. Later on, climate deterioration will reverse such gains. The denuded earth will dehydrate, water tables will drop drastically, most of the remaining vegetation will starve for lack of water, the topsoil will become powdery and will be carried away by winds, the temperature in the entire area will increase, water losses from evaporation will be greater and vertical as well as horizontal air movements (winds, storms) will be induced, which will prevent the formation and accumulation of rain clouds, causing a loss in precipitation. Then the droughts will strike the area and cause extreme water shortages.

This is the pattern of climate deterioration when land is excessively denuded. It is the unleasing of land and water losses which we are witnessing right now in the south and southwest of our country.

Reservoir planners seem to forget that the subsoil is a far bigger water storage reservoir than all our surface water reservoirs put together. If the water tables over the North American continent could be raised only 6 in., some 950 million acre-feet of water could be added to our water supply. This is nearly 30 times as much as Lake Mead's capacity.

Denudation of watersheds is definitely not the way to increase water storage.

FRANK D. STEINER,
Associate Design Engineer,
Pacific Gas & Electric Co.
San Francisco, Calif.

CALENDAR

American Society of Civil Engineers, winter meeting, Jackson, Miss., Feb. 18-22.

Association of Asphalt Paving Technologists, annual meeting and technical session, Atlanta Biltmore Hotel, Atlanta, Ga., Feb. 25-27.

American Concrete Institute, 53rd annual convention, Statler-Hilton Hotel, Dallas, Tex., Feb. 25-28.

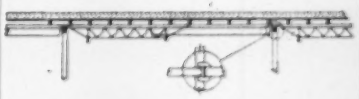
American Society of Heating and Air-Conditioning Engineers, 63rd annual meeting, Conrad Hilton Hotel, Chicago, Ill., Feb. 25-28.

University of Colorado, 20th annual highway engineering conference, University Memorial Center, Boulder, Colo., Feb. 28 and March 1.

American Society of Photogrammetry, American Congress on Surveying and Mapping, Shoreham Hotel, Washington, D. C., March 3-9.

Spanall
HORIZONTAL SHORING
FOR ALL BEAM AND SLAB CONCRETE FLOOR FORMS
SPANALL OF THE AMERICAS, INC.
Spanall of Canada, Ltd

Page 6. Spanall installs fast and easy.



Page 5. Spanall applies to any type of poured concrete construction.

Page 7. Plywood decking laid directly on Spanall.

Newest Catalog features new way to save time, cut costs

Page 2. Spanall replaces vertical shoring, frees work areas below forms.

Here is practical, profitable information about Spanall, the popular, new, all-metal Horizontal Shoring for concrete forms. Photos, charts and drawings clearly illustrate how Spanall is erected, stripped and stored—with new ease and speed... how Spanall adjusts quickly to any required span length—how Spanall forever eliminates cumbersome, costly vertical shoring... and actually saves as much as 40% in both time and money.

Get *all* the facts about Spanall—it could provide just the competitive advantage you'll need for 1957.

SPANALL OF THE AMERICAS, INC.
787 United Nations Plaza, New York 17, N. Y.

Gentlemen—Please send, without cost or obligation,_____copies of the new Spanall Catalog.

NAME _____ POSITION _____

FIRM _____

ADDRESS _____

CITY _____ STATE _____

REVELATION AIR HOSE . . .
for heavy duty service—defies abuse, weather, abrasion.

REVELATION CORD SUCTION HOSE . . .
specially designed to recover shape after crushing, resists wear, weather and hard use.

OVER 87 YEARS OF SERVICE TO INDUSTRY

Write today for more information and literature.

HAMILTON RUBBER

MANUFACTURING CORPORATION • Trenton 3, N. J.

A Division of Acme-Hamilton Manufacturing Corporation

ATLANTA • CHICAGO • CLEVELAND • HOUSTON • PITTSBURGH • INDIANAPOLIS • LOS ANGELES • NEW YORK • SAN FRANCISCO

How to put limestone and gumbo in their place

THIS is heavy going on a new section of four-lane U. S. 80 just east of Ranger, Texas. Collins Construction Co. of Austin put in 7.8 miles here and they handled 395,000 yards of material doing it. A lot of that was rock. And a lot was limestone and gumbo.

For this sort of heavy grading, Collins called in their CAT* No. 12 Motor Grader. "Finest all-around grader I ever saw," says veteran operator V. W. Nichols.

Notice that operator Nichols sits down to handle his No. 12, even in rough stretches like this. If an operator has to stand to see his work, he tires much quicker, no matter how good he is. The operator of a No. 12 enjoys the convenience of in-cab starting, too, and power steering, and the exclusive Caterpillar accelerator-decelerator. Most of all, he enjoys the assurance he's at the controls of a tough, reliable machine that's *built to do the hard work.*

Backbone of the No. 12 is the strongest frame in any motor grader now on the market. Special channels make it that way. Box section circles increase its durability, as do its box-type drawbars. And the engine is of the same hardy breed—clutch, transmission, final drive are built to take heavy motor grader service.

Other features help explain the No. 12's popularity with operators and owners, too. Fast, accurate mechanical controls. Anti-creep brakes. Blade maneuverability that lets you swing from ditch cut to bank cut in less than a minute without adjusting links. Your Caterpillar Dealer will give you full details—and a demonstration, any time. He's ready with expert service, also—and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

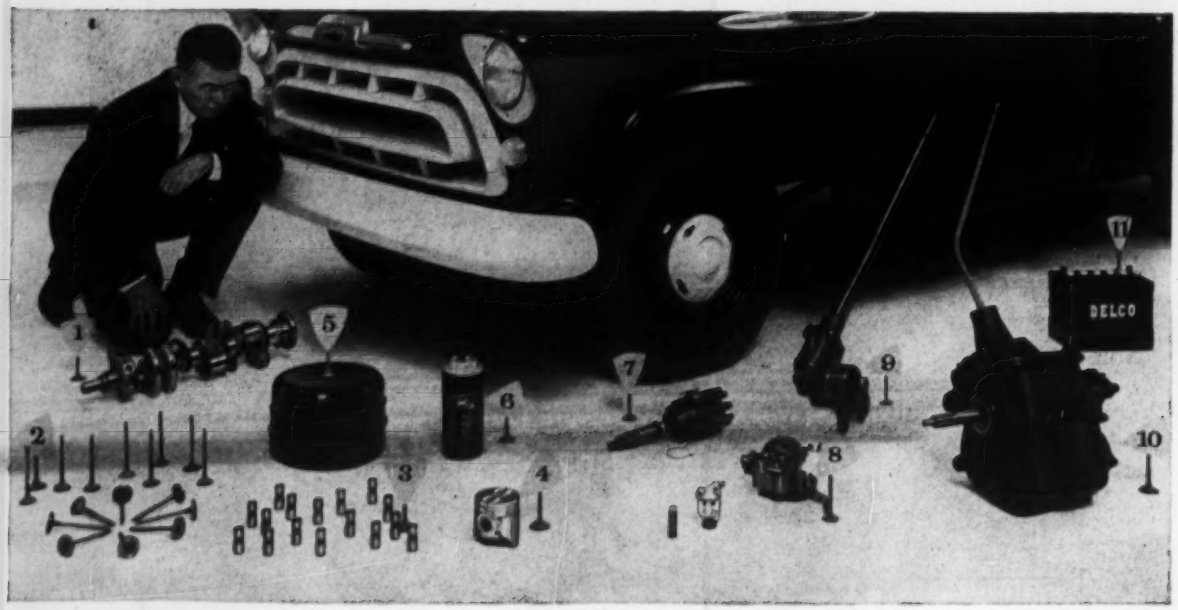
CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Diesel Engines • Tractors • Motor Graders • Earthmoving Equipment

WANTED—
THE HARD WORK

LOW HAULING COSTS COME RIGHT FROM THE "HEART" OF A '57 CHEVY



Many of the things that make a Chevrolet truck more economical to run are seldom seen by the owner. They're hidden features, deep in the truck's design. Here are just a few of them, to prove a Chevy's engineered better and built better for bigger savings!

1. *Forged steel crankshaft*—It's extra sturdy, precision machined and balanced, the foundation for dependable, long-lasting power!

2. *Aldipped exhaust valves**—Special aluminum treatment on valve surface protects valves against pitting; engine wears less, costs you less to run!

3. *Hydraulic valve lifters*—for longer valve life in V8's, fewer engine repair jobs.

4. *Chevy V8 piston*—Thanks to *short-stroke* V8 engine design, this piston travels a shorter distance, wears less. Short-stroke efficiency aids fuel economy, too!

5. *Oil-bath air cleaner—standard* on all Chevrolet truck engines for added protection against dust and foreign matter that shorten engine life.

6. *High-capacity oil filters***—They remove dirt particles from Chevy engine oil to cut engine wear and maintenance.

7. *Easy-adjust distributor points*—You can adjust this new Chevy V8 distributor *with the engine running*; it's added insurance against costly down time.

8. *Multiple fuel filters*—For *clean* fuel, all Chevy engines have fuel filters in the carburetor and fuel tank; in addition, V8's provide an *extra* filter at the carburetor.

9. *Ball-Gear steering mechanism*—Inside this steering gear scores of polished steel balls virtually eliminate friction. Less friction means less wear, less maintenance!

10. *Rugged manual transmission*—Synchro-Mesh design eliminates the need for double-clutching, reduces costly wear. Gears are shot-peened for extra strength.

11. *12-volt battery*—provides sure starting, good ignition, long battery life in all Chevrolet trucks.

And there are many more! See your Chevrolet dealer for all the dollar-saving facts. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

**On Thriftmaster 6, Trademaster V8.*

***Standard on V8's and Jobmaster, optional on Thriftmaster 6.*

1957 CHEVROLET TASK·FORCE TRUCKS

PROVED ON THE ALCAN HIGHWAY . . . CHAMPS OF EVERY WEIGHT CLASS! CHEVROLET

no
contractor
can
afford
to be
without

self-
propelled
air compressors

No contractor can afford to be without Schramm *Pneumatractors*

ELIMINATE A TRUCK . . . The operator simply climbs into the seat and drives a complete 125 cfm compressed air plant from job to job. Pneumatractors go where ordinary towed portables can't.

SAVE TIME . . . No delays, no crews tied up; Pneumatractors go where needed—start work at once.

PROVIDE EXTRA AIR . . . Pneumatractors can tow any standard portable compressor to the job and provide an extra 125 cfm of air.

MULTIPURPOSE . . . Pneumatractors are versatile machines for many jobs . . . shoveling, loading, trenching, digging, grading, backfilling, hoisting, hauling, sweeping, pumping and many others.

INITIAL COST IS LESS . . . Pneumatractors cost no more than ordinary towed portables . . . you save the cost of a tractor and other special purpose machines.

OPERATING COST IS LESS . . . Pneumatractors are easily serviced by any gasoline engine service man . . . no special training needed. Piston design uses less fuel than other types of compressors.

SAVE MANPOWER . . . One man operates a Pneumatractor . . . no manhandling required—they are safer.

COST SAVINGS BEGIN WHEN YOU DRIVE A PNEUMATRACTOR TO THE JOB

A Pneumatractor is both a 125 cfm air compressor *and* a wheel tractor—converting instantly from one to the other, right from the instrument panel.

Schramm Standard and Heavy Pneumatractors are simply designed and ruggedly built; they are equal to the toughest demands of heavy construction and maintenance work.

Standard Pneumatractor

SPECIFICATIONS (less accessory equipment):	
Actual Air Delivery	125 cfm @ 100 psi
Bore and Stroke—Engine (3 Cylinder)	4½" x 4¾"
Compressor (3 Cylinder)	4½" x 4¾"
4 Forward Speeds, 1 Reverse Speed	
Horsepower	41 hp

DIMENSIONS (without attachments):	
Overall Length	116"
Overall Width (depending on wheel set-up)	59" to 93"
Overall Height	63"
Weight	3650 lbs.
Dual Wheels and Sand Tires Available	

Accessories Available:

Pneumajack and Pneumafeed (wagon drills), winch, snow plow, rotary sweeper, post hole digger, mower, operator's cab and towing bar.

Heavy Pneumatractor

SPECIFICATIONS (less accessory equipment):	
Actual Air Delivery	125 cfm @ 100 psi
Bore and Stroke—Engine (3 Cylinder)	4½" x 4¾"
Compressor (3 Cylinder)	4½" x 4¾"
5 Forward Speeds, 1 Reverse Speed	
Horsepower	41 hp

DIMENSIONS (without attachments):	
Overall Length	117"
Overall Width (depending on wheel set-up)	57⅞" to 89⅞"
Overall Height	61¾"
Weight	6080 lbs.
Dual Wheels and Sand Tires Available	

Accessories Available:

Pneumajack and Pneumafeed (wagon drills), winch, snow plow, rotary sweeper, angledozer blade, platform scaffold, earth auger, post hole digger, mower, front end loader, backhoe, shovel, towing bar, hydraulic boom and operator's cab.

Standard Pneumatractor

. . . an air compressor with tractor features.

Heavy Pneumatractor

. . . a heavy loader and backhoe with a wide choice of versatile attachments . . . with the added convenience of air.

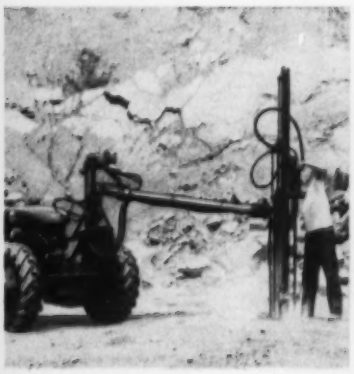
TURN PAGE . . . see why Pneumatractors are first on the job . . . last to leave.

CAN YOU AFFORD TO BE W

OPERATING AIR TOOLS—125 cfm instantly available for every compressed air need

POWER SHOVELING—Cylinder and dipper construction provides fast, powerful digging

LOADING — Full cubic yard bucke handles heaped loads up to 4000 l



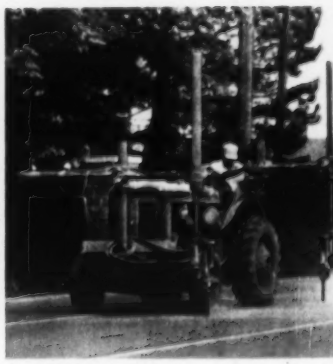
ROCK DRILLING—Self-propelled wagon drill—drills at any angle

HOISTING—Lifts, hoists, holds, carries, places

STAKE DRIVING—Fastest way to driv stakes and posts

BACKFILLING—7' straight or angling blade controlled by operator

TAMPING — Operates 3-gang tamper or four single tampers



MUDJACKING — Drills holes in pave ment for raising or undersealing

900 NORTH GARFIELD AVENUE Schr

WITHOUT THIS VERSATILITY?

ard bucket
to 4000 lb.

BREAKING OUT CONCRETE—Moves along as work progresses

TRENCHING—Bucket widths up to 36" —digs to 9'6"

GRADING — Tilting angle blade for gutter and shoulder grading

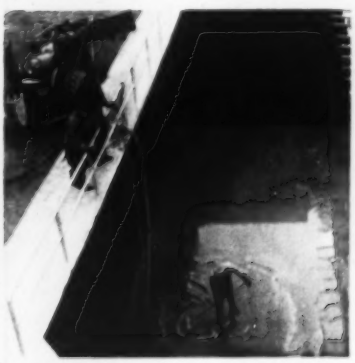
ay to drive

UNLOADING—High lift clears 9'6" side of dump truck; hydraulic dumping

TOWING—Pulls auxiliary equipment or extra air compressor

SWEEPING—7' Palmyra or steel brushes for heavy or light sweeping

s in pave-
rsealing



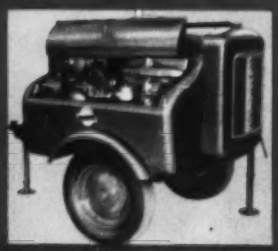
PUMPING WATER—Pumps water, sludge or raw sewage up to 400 gpm

PLOWING SNOW — 7' blade clears 6' path easily through wet or dry snow

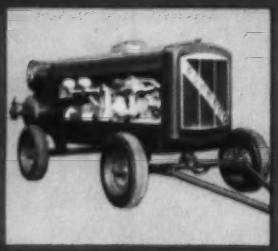
LIFTING — Universal movement of backhoe lifts, carries and places

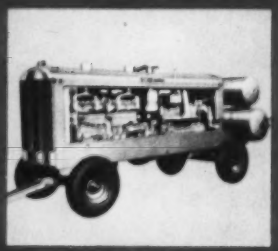
chramm, Inc. WEST CHESTER, PENNSYLVANIA

SCHRAMM—FOR ALL YOUR COMPRESSED AIR NEEDS

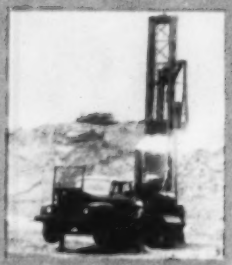


PNEUMAPOWER AIR COMPRESSORS—have engine and compressor in one unit; smallest, lightest, most compact air compressors.





UNISTAGE AIR COMPRESSORS—gasoline or diesel engine driven compressors with clutch; mounted in a frame as a rigid unit. Similarity of design and construction between engine and compressor means balanced construction, easier servicing, fewer replacement parts to stock.



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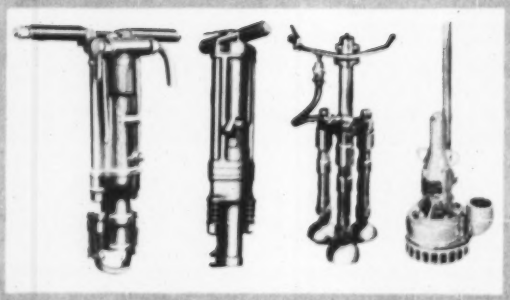

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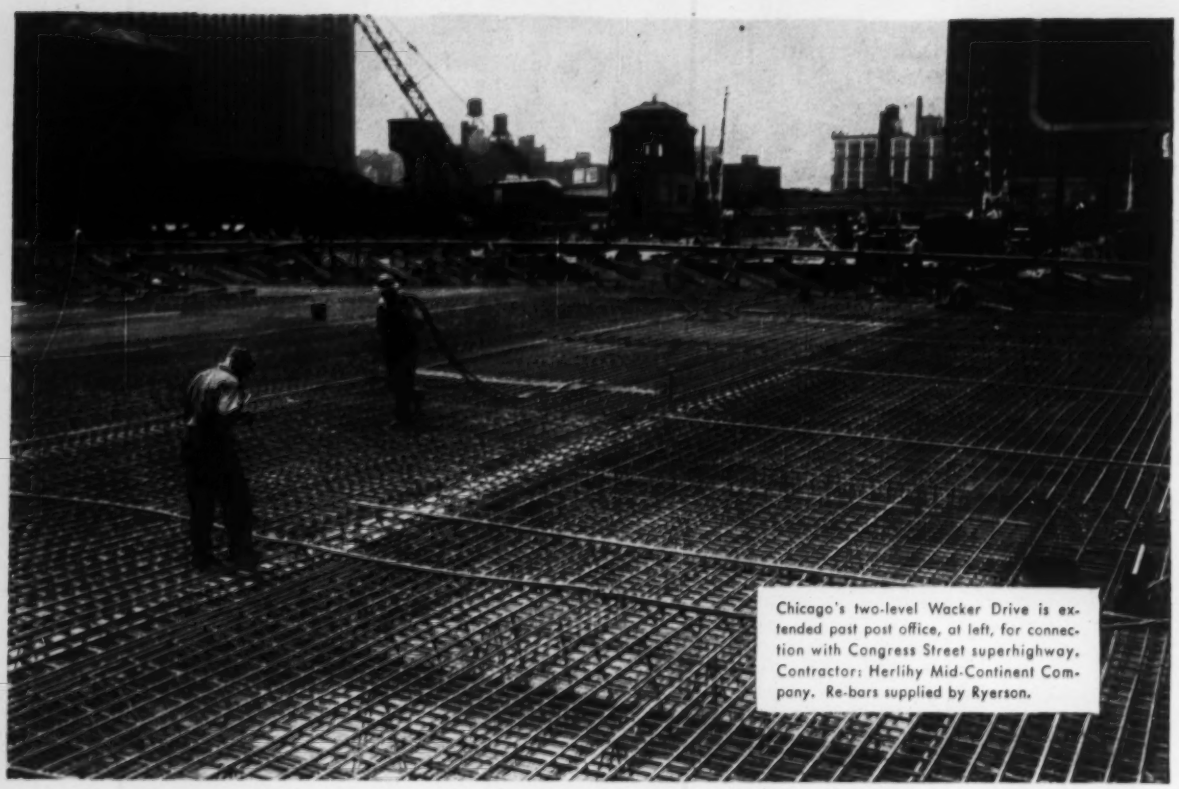
THE CONSTRUCTION WEEK

EXPLAINING THOSE HIGH BIDS—You can pretty much take your pick of a reason why the U. S. Bureau of Reclamation got bids $11 million over estimates on two major elements of its Trinity River Project in California (ENR Feb. 14, p. 23). Some say USBR did not take escalation of costs through the length of these contracts as seriously as did the bidders. Others just generally blame it on the impact of the highway program. A combination of these things may be the answer: Contractors, seeing their major costs of labor and equipment rising already, look to the highway work ahead to escalate these cost elements still further. And they are not about to tie themselves to any long-term deal like a dam or a tunnel at less than some fairly safe bid prices—especially with all the work in highways in prospect. Whatever the reason, USBR decided it could do no better and awarded the Trinity Project's big tunnel job last week (see page 45).

TOWER RECORD BROKEN AGAIN—The 30 month old height record held by KWTV's 572 ft TV tower in Oklahoma City has been beaten. At Caprock, N. M., a steel tower for station KSWS, Rosewell, N. M., has been topped out at 1,610 ft. Standing on an 18 ft square, 7 ft thick concrete base, it is anchored with 48 guys. It was erected by Andrews Towers, Inc., Ft. Worth, Texas.

UNION PICKETS FOR SUBPROFESSIONALS—Work on the $130 million Patapsco River Tunnel project in Baltimore was interrupted for two days last week when the American Federation of Technical Engineers (AFL-CIO) set up a picket line to obtain recognition as bargaining agent for a number of subprofessionals employed by Merritt-Chapman & Scott, prime contractor, and Singstad & Baillie, consulting engineers. Merritt-Chapman & Scott consented to an NLRB election to determine if the union will become bargaining agent for its surveying instrument men but Singstad & Baillie did not. AFTE drive was conducted by Local 152, headquartered in Philadelphia.

WOMEN CIVIL ENGINEERS—Great Britain's venerable Institution of Civil Engineers has, for the first time, elected a woman, Miss Mary Isolen Fergusson of Edinburgh, to full membership. Four other women are at present on the Institution's rolls, but at lower grades of membership. The American Society of Civil Engineers has 57 women among its membership, of which 15 are associate members and 42 juniors. Miss Elsie Eaves of this journal's staff is not only one of the associate members but also the first woman ever accepted to this grade of ASCE membership.



Chicago's two-level Wacker Drive is extended past post office, at left, for connection with Congress Street superhighway. Contractor: Herlihy Mid-Continent Company. Re-bars supplied by Ryerson.

Are you getting this 4-point service on reinforcing bars?

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WASHINGTON OBSERVER

Building trades unions are easing up on their demands for Taft-Hartley amendments. Nothing official has shown yet, but clear indications of this were seen during recent meetings between contractors and the building trades sponsored by Secretary of Labor Mitchell.

Three tentative agreements have been reached during the labor-contractor meetings at the Department of Labor.

A modified pre-hire proposal would let the National Labor Relations Board certify craft unions as bargaining agent where the contractor has a history of dealing with the union. Once the NLRB certification was given, unions could make agreements with employers before workers are hired for a particular project.

Contractors won union support for legalizing the T-H status of employer associations. Employers want this to give T-H legality to a lockout.

An agreement on permitting apprentice training funds to be an issue in bargaining was also reached; Taft-Hartley language apparently bars it from those "fringe benefits" that are bargainable.

On secondary boycotts, craft unions indicated they might take an employer statement that only unionized subcontractors would be used.

•

A "grand plan" for water resource development is getting Congressional attention. The idea is this: Over a 10-year period, the federal government would buy as much as $2.5 billion worth of bonds from state and local governments needing to develop water sources for domestic, municipal, industrial or other purposes. No more than $250 million worth of bonds could be bought in any single year.

It's worth watching because it has influential backing. Rep. Jim Wright of Texas first introduced it in the House; in the Senate, the influential Lyndon B. Johnson, Democratic leader and another Texan, picked up the idea in a nearly-identical bill. It may not—probably won't—pass at this session. But the proposal could point toward a future remedy. Proponents are noting that President Eisenhower's "grand plan" for highway building took a couple of years and plenty of revision to win acceptance on Capitol Hill.

•

A new VA housing act is moving through Congress. If the Congress goes along with the influential House Veterans Committee, there will be no increase in the VA interest rate from 4½% to 5%. This week the committee underscored its demand that veterans continue to get the 4½% rate.

The new bill would: (1) authorize VA to make advance commitments to builders that a direct loan will be forthcoming on a specific house under construction for a veteran, (2) increase to $12,500 the maximum the VA can make in a direct loan to a veteran unable to 4½% money. The present ceiling is $10,000.

The VA has made a major change in re-sale policy, also. Hereafter, a veteran who buys under the GI loan program can be relieved of future liability if the new purchaser complies with VA credit requirements when he purchases the loan. In the past, any default by the second purchaser left the original home buyer liable for the payment of the GI plan.

14.8 MILLION YARDS TO MOVE, 56 BRIDGES TO BUILD,

IN 29.6 MILE DALLAS-FORT WORTH "SIX-CHUTER"!

Unlike most other turnpikes, the 6-lane Lone Star Speedway is being cut, filled, borrowed and spanned along a populated route, crisscrossed by many heavily travelled roads. To add to contractors' headaches, up to 300,000 gallons of water a day have to be trucked in for compacting. Note how self-propelled scrapers are *tandemed* to tackle the sun-hardened soil. Tires are Goodyear's wide-base Hard Rock Lugs—now standard on much original equipment.

Tire maintenance in field helps construction men beat tight work schedule.

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THE IDEA:

Conceived in 1954 by a budget minded Administration and a cooperative Congress, lease-purchase was an attempt to buy federal buildings on the installment plan. But the program never won complete acceptance, so . . .

Supporter

FRANKLIN G. FLOETE, head of the General Services Administration, last week suspended the ailing program but prepared to defend the original plan.

Critic

ROBERT JONES already has put into the Congressional hopper a bill that would end lease-purchase permanently. He contends the program costs too much in interest.

Lease-Purchase Rings Up No Sale

The government has tossed in the towel—at least temporarily—on its much-publicized lease-purchase program for building hundreds of millions of dollars worth of federal buildings in partnership with private contractors and financiers.

Last week, after nearly a year of frustration in trying to get lease-purchase projects going, General Services Administrator Franklin Floete admitted defeat. He announced that no further lease-purchase projects would be put up for contract bids "until present inflationary pressures in the construction industry recede."

GSA people vigorously deny that the government is "abandoning" the program. "We're just putting it on ice for awhile," one spokesman said.

But the fact is that private contractors and investors simply haven't shown much interest in lease-purchase. Of 149 planned projects—totaling over $700 million—bids on only two projects have been accepted—one for a $2 million postoffice and courthouse in Rock Island, Ill., another for a $126,000 postoffice in St. Marys, Ohio.

General Services Administration, which handles the part of the program, had 98 projects in the works when the lease-purchase program was kicked off last April, including federal office buildings, postoffices and courthouses, customs houses and medical centers. Of these 98 projects, only nine have been put up for bids, two twice. No bids were offered on two, bids were rejected on six of the remaining seven, either because construction estimates went over the cost-ceiling authorized by Congress or because conditions of payment and financing unacceptable to the government were tacked on the bids (see boxscore).

Of the 51 postoffices—only projects assigned to the Postoffice Department to handle—48 projects have been authorized by Congress, 10 put up for bids, but again only one was accepted. The other nine bids were rejected on grounds similar to GSA's—they were either too high or contained too many qualifications.

Congressional leaders want to learn why haven't private builders and investors shown more interest in lease-purchase projects. Both Senate and House Public Works Committees have scheduled hearings on lease-purchase. The Senate Group, headed by Sen. Pat McNamara started this week; Rep. Robert Jones will begin his investigation next week.

Rep. Jones has a bill in the Congressional hopper to repeal lease-purchase legislation, and return government office-building to the direct appropriation method, under which the government asks Congress for money it needs to buy or build each project.

Congressional disappointment with the lease-purchase program's failure—as much or more than the Administration's—is the thing that moved GSA and the Postoffice Department to drop the whole plan. The public works committees will be looking at the whole history of lease-purchase to try to find out where it fell down.

Lease-purchase, from the beginning, was a "natural" for the new Administration. Nicely dovetailing with President Eisenhower's admonishings to cut direct federal spending, and to stimulate private business, it looked like a good way to get needed government office space through private contractors and investors, without adding big chunks to one year's budget.

The details were hammered out in the public works committees in 1954, when the Administration was in a more budget-cutting mood than it is now. Heads of executive departments complained to Congress that they couldn't get the money they needed to buy, build, or rent building space. Straight leasing was frowned on, both in the Administration and on Capitol Hill, as too expensive—particularly for large government facilities.

So lease-purchase was born as a kind of "build it on the installment plan" compromise. The government picked a site for a new postoffice, courthouse, or office building. It then got an esti-

. . . And Then There Was One

ONLY GSA BID accepted was for postoffice and courthouse in Rock Island, Ill.

- **GSA originally planned 149 projects . . .**
- **Of these, 98 received serious consideration . . .**
- **But only nine went out for bids, and of these nine . . .**
- **Only the one above will be built now.**

mate on building cost approved by the Congressional committees and put out bid invitations on the open market.

Builders and investors, such as insurance companies, were expected to come forth eagerly to take advantage of risk-free deal. The contractor and the investor were both assured of getting at least their original investment plus 4% interest. The building was to be leased to the government at prevailing rentals, plus 4% interest, for 5-year terms until, at the end of a specified 50-year life of the building, title would pass to Uncle Sam. Meanwhile, the government would accept all ownership responsibilities, including maintenance, custodial service, repairs and replacement costs, and the like.

The plan got the backing of the White House, the Budget Bureau, executive agencies concerned, and passed Congress in 1955. The projects were lined up last April, first bidding asked last fall. The results—if not the reasons why—are obvious.

Some answers will be vigorously put forth at the McNamara and Jones hearings. One is that—despite government guarantees—the private investor and contractor who undertake a lease-purchase deal are tied to it. They can "get out" and not lose any money if it goes sour, but they don't own the project so they can't turn around and sell it to someone else. The actual property title is held in trust.

Another factor is the interest rate. Four percent isn't as attractive in today's tight-money market as it looked back in 1954, and GSA people are the first to admit that contractors and investors are finding more attractive places to do business than on a government building site.

There has been some talk that GSA might up the interest rate, but this would have brought howls of protest in Congress. Jones, for example, in addition to favoring outright repeal of lease-purchase, is sharply criticizing the Postoffice Department's long-term lease arrangement. Under this, the government pays rent on a building for 30 years, at the end of which time it presumably is no longer interested in the building.

This program is particularly adapted to small postoffice buildings, which would be outdated in 30 years, anyway. But Jones says the government is now paying too much rent on these buildings, in the long run more than their outright purchase would cost.

The same trend, says Jones, will apply to lease-purchase buildings. Interest rates, he thinks, will go up to at least 5½%, costing the government more than outright purchase.

Under the Jones repealer, the 149 lease-purchase sites would be "saved." That is, the government would be authorized to go ahead and buy them, providing Congress approves the money. Critics of the repeal bill, however, are sure to point out that flooding the construction market with outright purchase money would be far more "inflationary" than the installment-credit "painlessness" aspects of lease-purchase.

SENATOR PATRICK McNAMARA'S committee will take a new look at the old problem of how the government can best finance its buildings.

Another of Jones' criticisms of the program is the tax payments the federal government must make to states and local municipalities for the lease-purchase sites and buildings.

The Jones repealer is no sure bet to go through Congress. Direct appropriations for government purchases of land sites and building costs are even less popular now than they were when lease-purchase was dreamed up, and yet direct purchase is the only foreseeable alternative.

Still a Mystery

Cause of tower collapse escapes investigators

Ruins of the 1,262 ft TV tower that collapsed Feb. 4 in Nashville, Tenn., have not as yet yielded any clues to the cause of the sudden failure, investigators report.

At the time of the collapse, the tower had been erected to its full height and anchored with 12 guys at four levels. The antenna had not been installed. Though the local weather bureau reported the wind velocity was only about 7 mph, the tower toppled over without warning, killing four men who were tightening bolts about 700 ft above the ground (ENR Feb. 14, p. 24).

An engineer observer said the tower buckled above the second guy—about 650 ft up.

Round bars and plate used for the structural members of the tower were made of T-1, a low-carbon alloy steel made by U. S. Steel Corp. Steel for the guys was supplied by the American Steel & Wire Division of that corporation. A spokesman for U. S. Steel told an ENR editor that preliminary investigations do not indicate that the products furnished by the corporation caused or contributed to the collapse.

Engineers of the General Electric Co., the prime contractor; Blaw-Knox, the fabricator; and John F. Beasley Construction Co., erection subcontractor, report they have not found the cause for the tower collapse. However, they claim that it was not caused by improper guy cable adjustment or inadequate tower design. There had been reports that the tension in the guys was being reduced just before the mishap, giving rise to a theory that one guy might have been slacked off too much and the resulting unbalanced loading responsible for the tower toppling.

For Trinity River Project—

First True Partnership Proposed

Interior Secretary Fred A. Seaton has proposed to Congress that it accept the offer of the Pacific Gas & Electric Co. to construct the power facilities of the Trinity River Project in California.

This partnership proposal is likely to run into political opposition, but even a fairly lengthy Congressional wrangle probably will not delay progress now under way on the project.

When Trinity, part of the Central Valley Project, was authorized in 1955, its sponsors agreed, in order to get the project voted, to give the Secretary of Interior 18 months to negotiate for the power development and submit a plan for Congressional approval.

The only private utility to offer to participate with the Bureau of Reclamation in building the project has been PG&E.

Under the proposal that Seaton sent to Congress last week:

- PG&E would build at an estimated cost of $55.5 million the power facilities at Trinity (98,000 kw), Lewiston (600 kw), Clear Creek (133,000 kw), and Spring Creek (153,000 kw), all units of the Trinity project, plus various auxiliary facilities.
- Buy from the government over a 50 year period the falling water required to operate the power facilities—at $4.6 million a year.

This arrangement, Seaton told Congress, would yield to the government new revenue of $165 million over the 50 year life of the contract.

Public power supporters offer the alternative of federal development with interconnection of the power facilities of Trinity with Shasta, Keswick, Nimbus, and Folsom Dams, and with the PG&E system. Also under federal development, power capacity would be reduced from the PG&E planned total of 384,000 kw to 369,000 kw in order to leave more water for irrigation.

The partnership proposal is meeting opposition from pro-public power Democrats and some Republicans from California and the West because of the touchy question of who gets the first rights to the power—"preference." Under federal development, first preference on power would be given to public power groups. Under the PG&E arrangement, the utility would own the power for 50 years. So Congress would have to, in effect, abrogate the preference law.

The dispute over the power facilities is not stopping construction of the Trinity project. Construction is proceeding on the non-power phases. Last May Reclamation awarded a $1.3 million contract to Gates & Fox Co. to build a tunnel to divert the Trinity in preparation for building the dam.

- **Tunnel contract awarded**—This week, Reclamation authorized for award a $36.6 million contract for the Clear Creek Tunnel to five contractors—The Shea Co., Henry J. Kaiser Co., Morrison-Knudsen, Macco Corp., and Raymond Concrete Pile Co. This 11 mile, 17 ft diameter high pressure tunnel will carry water from the Lewiston Dam just below Trinity Dam to the Whiskeytown Dam on the Clear Creek. This award has been authorized although the bid was much higher than the engineers' estimates of $25.6 million (ENR Feb. 14, p. 23).

Soon to be announced will be the prime contract for the Trinity Dam itself. Low bid for this project was $48.9 million from the Guy F. Atkinson Co. group of six contractors. This, too, was $11 million over engineers' estimate.

Since power facilities are not installed until construction nears completion, any delays in resolving the power problem should not slow down other work.

Open-Spandrel Bridge Built on Skew

Unusual in design practice in the U. S. is the recently completed Wilson Mills Road Bridge near Cleveland.

Costing $726,500, the twin open-spandrel barrel-arch bridge supports a four lane road over Euclid Creek and provides a badly needed east-west traffic artery through the easterly portion of Cleveland's metropolitan area.

The bridge deck has a 0.4% uniform grade and is constructed on a tangent for most of its length. The east end has a 5,729 ft center-line radius of curvature for a distance of 70 ft. The total bridge length is 362 ft.

The alignment was dictated by the location of two existing connecting roads, resulting in an 18° 40′ skew in the structure. The clear span of the center arch is 133 ft while those of the two end arches are 107 ft 5 in. each.

The end arches were designed as elastic structures, integral with the abutment and intermediate pier, to be stable under construction without requiring support from the center arch. Abutments were buttress type, earth filled carried to rock foundation. All arches were designed to be fixed at the spring lines after construction was completed.

The spandrels are open and the deck is supported on diaphragm walls parallel to the skew. Appearing on the roadway level as one bridge, the two 28 ft roadways, two 4 ft sidewalks and a 6 ft median strip are actually carried on separate structures to the footings to reduce torsional stress. The median strip is split with a 1 in. joint. Arch ribs are 26 ft wide and thickness varies from 16 in. at the crown to 30 in. at the spring line to reduce dead load and streamline the appearance of the bridge. Three 8 in. pressed fiber tubes are laid in each sidewalk to reduce concrete volume.

The Osborn Engineering Co. of Cleveland were consulting engineers on the project and The Horwitz Co., general contractors.

NSPE Unveils Its Ideal Law

Proposed supplement to model registration, law covers corporations offering engineering services

Reflecting its Engineers' Week theme for this year—"Engineering, America's greatest resource"—the National Society of Professional Engineers based its spring convention at Charleston, S. C. last week on means for developing this resource further. It held sessions on ethics and on engineer registration laws.

Its special luncheon speaker, Dean C. J. Freund of Detroit University School of Engineering stressed integrity as the fundamental quality for engineering greatness and its banquet speaker Maj. Gen. Louis W. Prentiss (USA Ret.), executive vice president, American Road Builders Association, used the national highway program to point out how the development of this resource of engineering is being enhanced by huge roadbuilding machines, electronic computers, research and better aids to education.

Attendance totaled 200, and delegates were present from 41 states.

Among the program topics, engineer registration excited the widest interest by virtue of the unveiling for general discussion of the proposed "ideal" registration law developed since 1955 by an NSPE committee.

The purpose of this ideal law, in the words of R. J. Rhinehart, NSPE president, is to reflect the minimum requirements necessary to place engineering practice on the highest possible plane 25 to 50 years hence. Both higher standards and greater uniformity among state registration laws are sought. The law is not considered, said Mr. Rhinehart, as a replacement for the model law, which has served so well as a guide for state legislation, but as a supplement to it to point the way in the future.

Some of the areas on which this long-term look is apt to impinge were revealed by the discussion of the present draft of the ideal law, which was examined section by section both by those present and by previously received written commentary.

There are those, for example, who believe the definition of practice of engineering should be broadened to include surveying and mapping and even prime contracts of an architectural nature. Others think registration by "eminance", without an examination, should be curtailed. The practice of putting receipts from registration fees into a state's general funds was criticized. On the other hand, giving registration boards injunctive powers to restrain persons from violating provisions of the law was recommended, as was a requirement that all public work by political subdivisions be done under the supervision of registered professional engineers.

Surprising to many was the small number of critical comments made on the ideal law's section relating to "forms of organization to practice," which covers the offering of engineering service through corporations. This section states:

"Professional engineers may practice under this Act as individuals, partners, or through joint stock associations or corporations. In the case of practice through a joint stock association or corporation, it shall be required at all times that the chief executive officer and a majority of the other executive officers and a majority of the directors be professional engineers under this Act: And be it further provided that all plans, designs, drawings, specifications or reports issued by or for the partnership, joint stock association or corporation bear the seal and signature of the professional engineer directly responsible for such work."

Whether this suggested solution of the corporate practice question will receive final approval is, of course, not certain, as is not also the fate of the other sections of the draft. The ideal law, still in preliminary form, is to undergo another revision, and then be offered for further discussion.

In the field of ethics, too, as in registration, NSPE has under development a basic guidance document. In the form of a brochure, it will contain the engineer's creed of the NSPE, the canons of ethics for engineers as developed by Engineers' Council for Professional Development and expansion and interpretation of these canons, which NSPE has labeled rules of conduct. A draft of these rules was presented to the convention, and discussed section by section as a step toward further refinement and eventual adoption.

Largest Cantilevers to Support Roof Hangar

A new hangar to be started shortly at San Francisco International Airport will have the longest cantilevers ever used in a building. Main roof supports for the 309x363 ft structure will be steel plate girders with an overall length of 363 ft and a cantilever of 142 ft at each end. Supports for each girder will be a pair of symmetrically placed columns 79 ft apart.

The 125,000 sq ft hangar will be the major item in a $6.8 million expansion at the California airport by United Air Lines. Also included in the project are a kitchen, cafeteria, boiler plant, airplane wash rack, 900 car parking lot, and underground utilities for simultaneous line maintenance of five planes.

The hangar roof will be framed with six of the record girders, spaced 51 ft 6 in. c-c. Framing between the girders will be steel-truss purlins. The roof will be a steel deck topped with insulation and lightweight roofing. Walls will be reinforced concrete block. Designed for both jet and piston-engine planes, the building will have an inside height ranging up to 52 ft maximum at the doors.

The new facilities will be located on a 40 acre plot. The air line is negotiating with the city to lease an additional 8.6 acres in the same area.

Some work on the job will start next month. General construction bids will be invited in April. Completion is scheduled for the middle of next year.

Contracts already have been signed for structural steel (Pacific Iron & Steel Co., Los Angeles) and piles (Raymond Concrete Pile Co., San Francisco).

Architects for the job are Skidmore, Owings & Merrill, of San Francisco. H. J. Brunnier, of San Francisco, is the structural consultant.

Tackling Traffic

New York City projects will cost $125 million

Attempting to find a place for the 24 million additional vehicles that its George Washington Bridge will handle when current improvements are completed, the Port of New York Authority last week made public plans for $125 million worth of work within New York City.

Addition of a second deck to the big Hudson River bridge is now under way, at a cost of $22 million. When completed, the six lane lower deck is expected to increase the bridge's capacity from the present 36 million yearly to about 60 million.

To handle this tremendous traffic increase in the narrow, heavily built-up northern neck of Manhattan Island will entail a $40 million, 12 lane depressed expressway across the island, running eastward from the existing bridge plaza to the high bluffs bordering the Harlem River. The expressway, in turn, would connect to a new high-level bridge across the Harlem, cost of which was not included in the PNYA release. At the eastern end of this new bridge, the road would connect with the Cross-Bronx and Major Deegan Expressways, leading to main east and northbound highway connections.

In addition, PNYA plans to build a network of new exit and approach roads at the Manhattan bridge plaza of the big suspension structure.

Key to the proposal would be construction of a new interurban bus terminal on a second level above the cross-island expressway. This terminal —with direct connections to the city's subway system—would handle 255 bus movements per hour, permitting a 70% expansion of the number of buses now using the bridge.

Biggest problem would be clearing of right-of-way across the island, in an area solidly occupied by apartment buildings and small business establishments. The property to be cleared is valued on tax rolls at $6 million.

Register of U. S. Dams Is Under Preparation

A register of about 3,000 important dams in the U. S. is being prepared under the sponsorship of the United States Committee on Large Dams.

The new publication will be a reference document containing the names, vital dimensions and other salient facts on dams in this country. In addition, the name of the owner of the dam, the engineering firm responsible for the design, and the construction contractor will be included in the register. The U. S. Committee on Large Dams believes it will be making a major contribution to the engineering profession and to the public by undertaking this work.

Owners, engineering firms and contractors are urged to cooperate in this work by contributing any data available to them on structures that they own, have designed or built. Necessary forms for recording the data may be had from the Chairman of the Committee on the Register of Dams, T. W. Mermel, 4540 43rd St., N.W., Washington 16, D. C.

Industry Gets the Nod On St. Lawrence Power

New York State will have an $88 million aluminum reduction plant, with an aluminum casting plant of undisclosed cost alongside, as the result of action taken last week on assignment of St. Lawrence River power.

In a decision that was generally heralded—but condemned in some quarters—Gov. Averell Harriman approved sale of about 25% of New York's share of St. Lawrence power to Reynolds Metals Company for a reduction plant planned for Rooseveltown, N. Y. His action was based on announced plans of General Motors Corp. to move into Rooseveltown with an aluminum casting plant, to use the Reynolds product.

The governor's decision was basically between giving the power to industry or to domestic and rural users. In effect, he chose payrolls rather than cheaper power for the people of the northern New York area. He said, "These new industries will be of great benefit not only to the north country . . . but also to business generally in the state."

The Reynolds aluminum plant, assigned 239,000 kw by this move, will not employ more than about 1,200 people, but GM's parts plant will employ another several hundred, and it can be expected that the two will cause a great satellite growth of lighter industry and services.

Arena Roof Will Span 1,080 ft

Preliminary plans for a sports arena with the biggest clear span roof ever built were disclosed last week in New York City. Spacious enough to enclose a half-mile race track, the proposed building will be 1,400x1,080 ft in plan and will rise to a maximum height of 250 ft at the center.

The arena roof as conceived in preliminary studies by the architects, Frank Grad & Sons, Newark, N. J., and Urbahn, Brayton & Burrows, New York, and the engineers, Roberts & Schaefer, New York, will consist of a series of sections, each measuring about 200 ft along the length of the building and arching parabolically across the full 1,080 ft width. Each of these sections, besides having a parabolic axis, will also have a parabolic cross section, open side up. Geometrically speaking, the surfaces of these divisions will be hyperbolic paraboloids.

The units will be constructed of flat aluminum plates welded together and stiffened along their edges—that is along the ridge lines where adjoining sections are connected—with either extrusions or structural shapes.

Plates between ridges will terminate along the sides of the building at the top of concrete walls, but the ridge stiffeners will continued downward to pile-supported reinforced concrete buttresses.

End walls will be framed with vertical trusses and closed in with metal and glass panels.

Further study of the building by model tests is now under way by Roberts & Schaefer.

The main activity envisioned for the arena by its developers is harness racing. They hope to obtain legislative approval to operate during a four-months winter season when other tracks in the metropolitan area are closed down. However, with a seating capacity of 150,000, parking accommodations for 15,000 cars, and ample room for baseball, football, conventions and other crowd-drawing functions, the development, called Olympic City, is planned for all-year operation.

Cost of the building alone is estimated at $27 million. Related construction runs the estimated total cost of the project to $57.4 million.

How to Cut Construction Costs

Industry conference is told to keep records, buy wisely, design well and keep personnel informed

Efficient materials purchasing, careful use of equipment, efficient design procedures, good progress control, and —most important—close attention to human relations at both the supervisory and field employee level, are the principal ways to cut construction costs.

That's the consensus of a recent two-day conference on the subject, which attracted more than 240 industry leaders to the University of California's Berkeley campus. Industrial consultants and bankers, company presidents and union business agents, professors and project managers added their suggestions to those made by purchasing agents, personnel directors, engineers and estimators.

The program—slated to become an annual event—was sponsored jointly by the University of California, the Construction Division of the American Society of Civil Engineers and the Northern California Chapter of the Associated General Contractors of America.

• Tell Them Why

Keynote speaker was Lillian Gilbreth, New York industrial consultant, who with her husband, the late Frank Gilbreth, was a pioneer in industrial engineering.

Mrs. Gilbreth emphasized the point—which is too often overlooked by management—that any change in operational procedures affects the men directly involved and, conversely, to an even greater extent, the men involved affect the success or failure of the changes, whether they be in method or in the use of new and improved machinery.

This last point was greatly expanded by Lamar Childers, business representative of the Alameda County Building Trades Council, who stressed the need for explaining to workmen why a job should be done in a certain way or why a particular machine should be used for a certain job. Too many supervisors order improvements with the attitude "Never mind why, just do it"—and then can't understand why new ideas do not work out well.

Childers pointed out that most people resist changes for one of two reasons: They are afraid of being downgraded or of having their job eliminated, or (and this is particularly true of older workmen) they are reluctant to learn new skills.

The supervisor who explains the reasons for changes can inevitably get full cooperation from the workmen—particularly if the explanation stresses the importance of the man in making innovations successful. In overcoming the aversion to learning new methods, Childers stated that union apprenticeship programs are effective for new men in the field, but the main burden of retraining older men lies squarely with management.

• Organization Needed

In a breakdown of the factors involved in effective programming, considerable attention was paid to men, materials, and machines both as independent and interdependent components of a job. Douglas Baker, project manager on Monticello Dam, pounded out the need for organization. This need, he said, must be met initially during the bidding stages, must be reviewed constantly during the life of the job and must be continued until the last man is paid off.

The importance of organization was further expanded by Paul J. Stafford of Kaiser Engineers. Stafford stated that contractors are often in so much of a hurry to start a job that they fail to set it up properly. Equipment is sent to a job before it is needed, men are ordered out before they have sufficient machines or materials to work with, and materials are delivered in a rush, only to become a storage and rehandling problem. Constant surveillance in these matters, he said, can reduce costs greatly.

Efficient purchasing procedures also were a topic of heavy discussion at the conference. It was brought out that getting the best price is only one way of cutting costs through proper purchasing. Of equal or greater importance is having the right materials delivered at the right time, and in only the quantities needed.

Appreciable economies also can be effected by standardizing sizes (where possible), by expiditing deliveries and by getting the most favorable payment terms.

Equipment cost records by contractors also came up for critical discussion. W. A. Abrahamson of Morrison Knudsen Co. cited a recent survey which showed that only one in ten contractors keeps records on the cost of owning and operating heavy equipment . . . this in spite of the fact that proper use of equipment is often a measure of the contractor's ability to survive. According to Abrahamson, proper equipment cost records will help the contractor make the most of the equipment he owns, and will permit him to consider intelligently his needs in terms of new equipment purchases.

Contractors were not alone in being told how to cut costs. Col. Paul Troxler, Corps of Engineers, and Grant Gordon of Guy F. Atkinson Co. brought out the great need for design economies and good specifications. Troxler's appeal was for increasing use of modualar design—which is nothing more than a system of dimensioning component parts of a structure in multiples of a basic unit. While some progress has been made in this respect, Troxler holds that there is still much room for improvement, particularly in the fields of plumbing, heating and ventilating.

New Lakes Diversion Won't Hurt

Last week the Army Engineers in Chicago released their report on what effect a 1,000-cfs increase in the diversion of water from Lake Michigan would have on the Great Lakes and the St. Lawrence River.

Increasing the amount of diversion from Lake Michigan, at Chicago, by 1,000 cfs, over a three year period would not greatly affect the levels of the Great Lakes. According to the report, the levels of Lakes Michigan and Huron would be lowered only $\frac{5}{8}$ in. and Lakes Erie and Ontario $\frac{3}{8}$ in.

The Army Engineer report was prepared by the North Central Division, under Brig. Gen. Paul D. Berrigan for the Director of the Budget Bureau. Its chief purpose is to supply needed information on the effects of increasing the diversion, as pointed out in President Eisenhower's memorandum of disapproval when he vetoed a bill last year which would have authorized a three year test increase of 1,000 cfs in the diversion from Lake Michigan at Chicago. A similar bill authorizing a test increase of 1,000 cfs for three years is now before Congress.

Normally, the amount of diversion of Lake Michigan water at Chicago is limited by a Supreme Court decision to 1,500 cfs, plus domestic pumpage. However, to alleviate low water shipping conditions in the Illinois Waterway, the Army Engineers secured authority last

December to increase the amount of diversion to a maximum of 7,000 cfs (ENR Dec. 27, 1956, p. 21). Originally the increased diversion was to end on January 31, but permission was secured to extend the time to March 1.

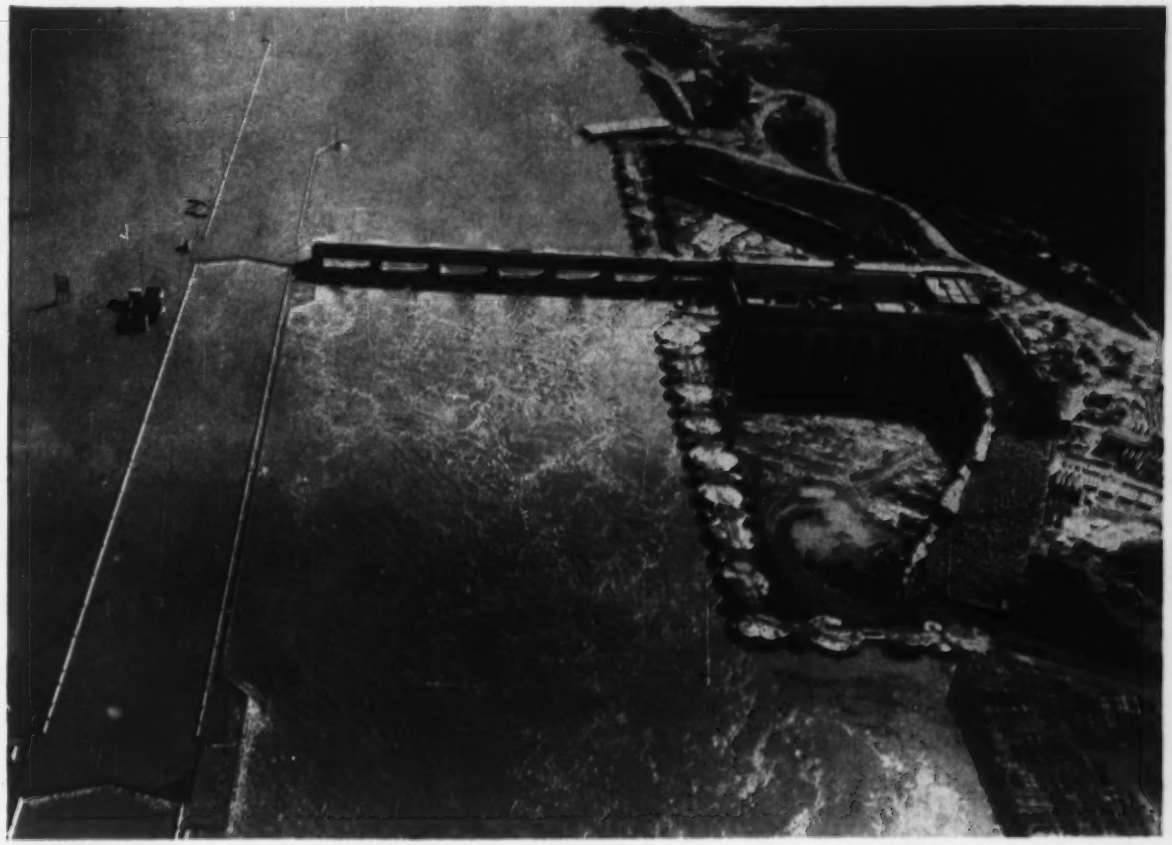
In his report, General Berrigan points out that the temporary effects of increasing the diversion 1,000 cfs would diminish gradually and disappear about 15 years after the diversion was discontinued.

Moreover, the lowering of the lake levels could be compensated for in various ways. For Lakes Michigan and Huron the lowering could be offset by constructing a deeply submerged sill in the St. Clair River at an estimated cost of $1.5 million. The lowering effect in Lake Erie could be compensated for by operating the control gates of the Niagara River remedial works now nearing completion, so as to keep the level of the pool above the works at a stage 0.22 ft higher than presently specified. For Lake Ontario proper adjustment could be made in the water-level stages for the St. Lawrence power structures, when completed, to avoid any significant change in the levels of Lake Ontario due to the increased diversion. All of these measures would require coordination with Canada, according to the report. The level of Lake Superior would not be affected by the diversion.

Increasing the diversion at Chicago by 1,000 cfs over a three year period, according to the report, would have a certain amount of effect on the generation of hydroelectric power. However, it could reduce the total output by a small fraction of 1%.

• **Navigation effect**—The lowering of the water levels would adversely affect navigation slightly during low-lake stages, but the effect is so small and of such temporary nature that it is impracticable to evaluate the effects in monetary terms. Similarly, the increased diversion would benefit navigation on the Mississippi River, but the monetary value of the benefit would be so small as not to be measurable.

The Army Engineer report also includes a study of the effects of a permanent diversion of 1,000 cfs. Such a diversion would lower Lakes Michigan and Huron only 1 in., and Lakes Erie and Ontaria, only ⅜ in.



CHEATHAM LOCK AND DAM went under water in this month's Cumberland River flood. And it could happen again.

Flooded Dam—Result of Building the Last First?

Submergence, such as happened this month, could happen any year to Cheatham Dam and lock on the Cumberland River in Tennessee—at least until two flood-control dams are built on the Stones and Harpeth Rivers that empty into the Cumberland upstream.

The wet state of affairs pictured above is said to be the result of building out of sequence. Cheatham, as originally planned, was to have been built after completion of Stewart's Ferry Dam on the Stones and the Inland Dams on the Harpeth. But, according to a Corps of Engineers spokesman, Cheatham went up first "because public and Congressional sentiment favored its construction ahead of the flood-control projects on the two smaller streams."

The Corps offered this explanation to put down rumors that 9 or 10 ft will have to be added to Cheatham's height to control flood waters. The Stones and Harpeth projects have been authorized by Congress, but no appropriations have yet been made to construct them.

The flood waters this year, pouring down from the Harpeth and Stones Valley, stopped all river traffic from Jan. 29 through Feb. 4.

Sewage Grants Start

Federal aid for sewerage totals $3.8 million

Federal construction grants for municipal sewage treatment plants hit the 60 mark last week, the U. S. Public Health Service reported.

The agency, which administers the $50 million a year program enacted last August, said it has approved grants totaling $3.8 million for 60 cities and towns in 14 states. The municipalities, ranging from 280 to 250,000 in population, added $11.9 million of their own funds to bring the cost of the facilities to $15.8 million.

Under the 10 year, $500 million program authorized by Congress, PHS grants are limited to $250,000 or 30% of the total of a project, whichever is less.

Communities in Wisconsin, Missouri and Kansas accounted for more than half of the first 60 grants—with 14, 12, and 10, respectively. Trailing were Mississippi and North Dakota, each with four; North Carolina and Washington State, each with two; and Alabama, Arizona, Colorado, Louisiana, Rhode Island, South Carolina and Wyoming with one each.

• **And first enforcement**—First federal enforcement action under the new water pollution control law was begun last week as five oil companies were told to halt discharge of oil well wastes into north Louisiana streams.

Secretary of Health, Education, and Welfare Marion B. Folsom forwarded recommendations of a special board set up under the 1956 Pollution Control Act to take testimony on alleged water pollution. The board recommended the operators stop discharging the wastes within the next 90 days.

On the basis of investigation by the PHS, findings of pollution of these interstate waters had been made by the Surgeon General in June 1954.

Maryland Report Shows Skyrocketing Road Costs

The State of Maryland could not possibly carry through its ambitious 12 year highway improvement program if it were not for the increase in federal aid funds. In a report to the state legislature, the Maryland State Roads Commission pointed to soaring costs, difficult right-of-way problems and more stringent design requirements as items contributing to greatly increased costs of the program in its first four years.

In brief, the commission reported that its 12 year program, originally figured at a cost of $568 million, will eventually cost $965 million. Of this rise, $153 million will be due to increased costs, $111 million to federal design standards changes, and $53 million to interstate road projects not originally scheduled.

An analysis of costs during 1954, 1955 and the first half of 1956 showed that construction was 24% above estimates, engineering 20% and right-of-way acquisitions a whopping 61%.

With the right-of-way problem in mind, the commission asked the general assembly to approve creation of a $10 million revolving fund to be used exclusively for advanced acquisition of roadways.

In addition, the commission recommended extension of the 12 year program for another three years so that it would coincide with the period covered by federal legislation; an increase in motor vehicle license tag fees to provide more money for highway maintenance; permission to transfer $4 million a year from construction to maintenance work, and more effective roadside control laws.

320 Room Hotel to Rise at N.Y. Airport

New York International Airport will have a 320 room hotel within a year, it was announced last week. The Port of New York Authority, the bi-state agency that operates the airport, announced award of a $4.3 million contract for construction of the hotel on a 10 acre site just off the field.

George F. Driscoll Co. and Moccia Construction Corp., New York contractors signed for the project, will start work immediately. Completion is scheduled for next January.

The hotel will be a 6 story, white brick building, fully air-conditioned and equipped throughout with radio and television.

It will have facilities for conferences and small receptions, and parking accommodations for 175 cars. If later expansion is warranted, a 140 room rear wing can be added to the structure as now planned. Because of its proximity to airfield noise sources, the building will have ½ in. plate-glass windows set in resilient material.

William B. Tabler, New York architect, designed the hotel. It will be operated as the International Hotel by the Knott Hotels Corp.

Turnpike Commission End Is Sought in New State Bill

A measure that would end the function of the Pennsylvania Turnpike Commission and setup a board of state officials as substitute has been introduced in the Pennsylvania legislature.

Although the measure was introduced by two Republicans in the legislature, Gov. George M. Leader, a Democrat, had proposed a similar change in the pike administrative structure.

The new bill would abolish the present five man commission and substitute in its place a commission consisting of the governor, the lieutenant-governor, the state treasurer, the auditor general, the speaker of the House, the president of the Senate and party floor leaders of both branches of the legislature—all elected officials. The secretary of highways would remain a member ex-officio.

The bill also provides that the governor would be the president of the new board and that seven members would constitute a quorum. Construction work would be handled under State Highway Department supervision.

Governor Leader recently removed the chairman and several commissioners of the Turnpike Commission as part of a long continuing campaign against the commission and its operation.

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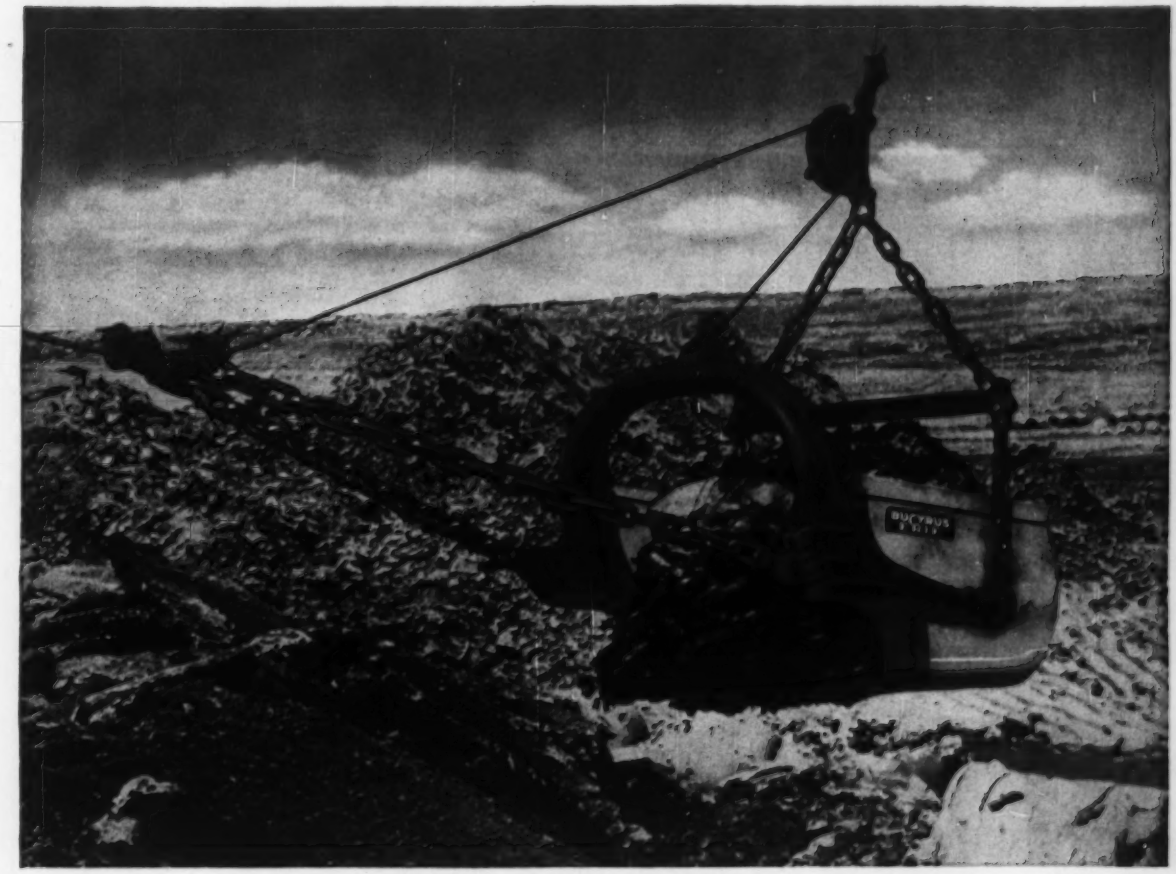

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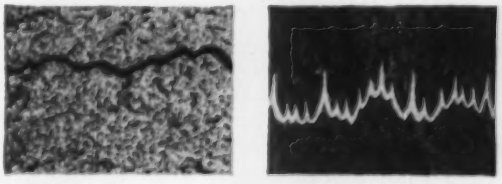
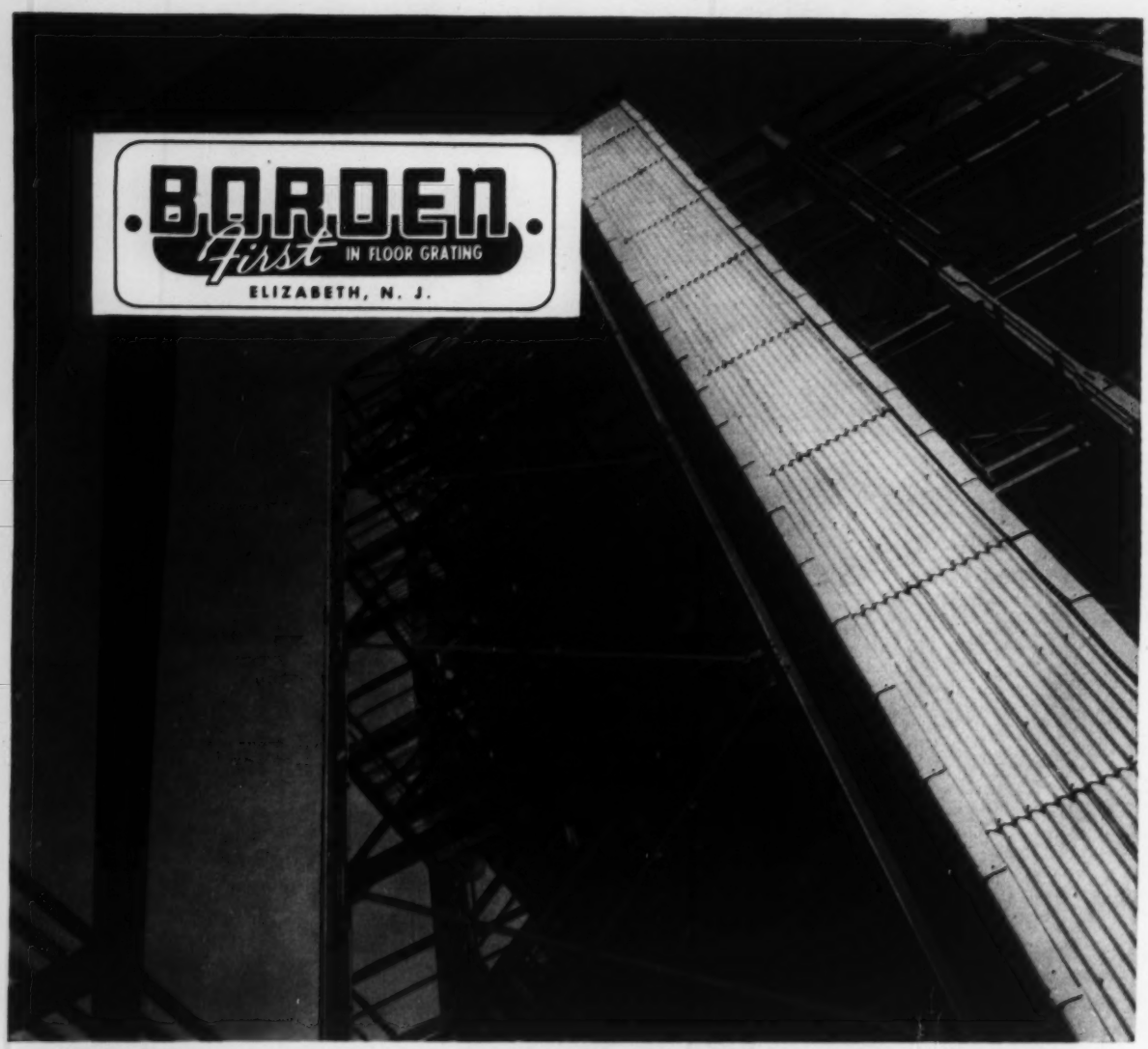


The BECOLOY fracture surface at right shows the tough, fibrous structure that imparts high strength to this alloy. Ordinary steel fracture surface, at left, has a coarse, crystalline pattern. 19R56

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN



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Highlights of the Year Ahead

- **Cost savings will be sought in field and office** p 54
- **Highway construction will dominate the landscape** p 86
- **More building design will be based on plastic theory** p 106
- **More states will tackle water resource development** p 150
- **Federal aid to sewage works projects will be tested** p 190

Keep Costs Down— To Keep Construction Healthy

(Concluded from front cover)

The construction industry's efforts to keep costs from rising have been good but not good enough. Last year in this space, it was noted that a dollar buys less and less construction every year. The statement was made that "the facilities that cost $18.7 billion in 1955 could have been built for half that in 1939."

The comparison is no better for the $21.7 billion spent on heavy construction in 1956. The cost rise, as measured by the ENR Indexes, was again 4½%. To be sure, these indexes reflect the costs of materials and labor, over which engineers and contractors have little control. But it was also true in 1956 that the cost of construction to the customer, as measured by the available contractor selling price indexes, rose faster in some cases than did the basic costs of labor and materials.

The challenge of this situation is unmistakable. Unless engineers in their planning, design and construction can effect savings, fewer facilities requiring their talents are going to be built. And this can happen even while the annual dollar volume of construction is rising. Actually this may have occurred in 1956 with respect to total construction put into place. For, according to the Department of Commerce figures, the dollar total increased only 5% over 1955, while costs may have increased more than that. Heavy construction, with a dollar volume increase of 16%, was still ahead of its cost increase, but it, too, could be threatened this year.

With construction at such a high level as it is, smaller annual percentage increases in dollar volume must be expected. Unless the cost increases are less than the dollar volume increases, the physical volume of construction goes down and not up. Result: We do not have an expanding economy, but an inflated one. And it is against such a danger that the President has warned in both his state-of-the-union message and his economic report.

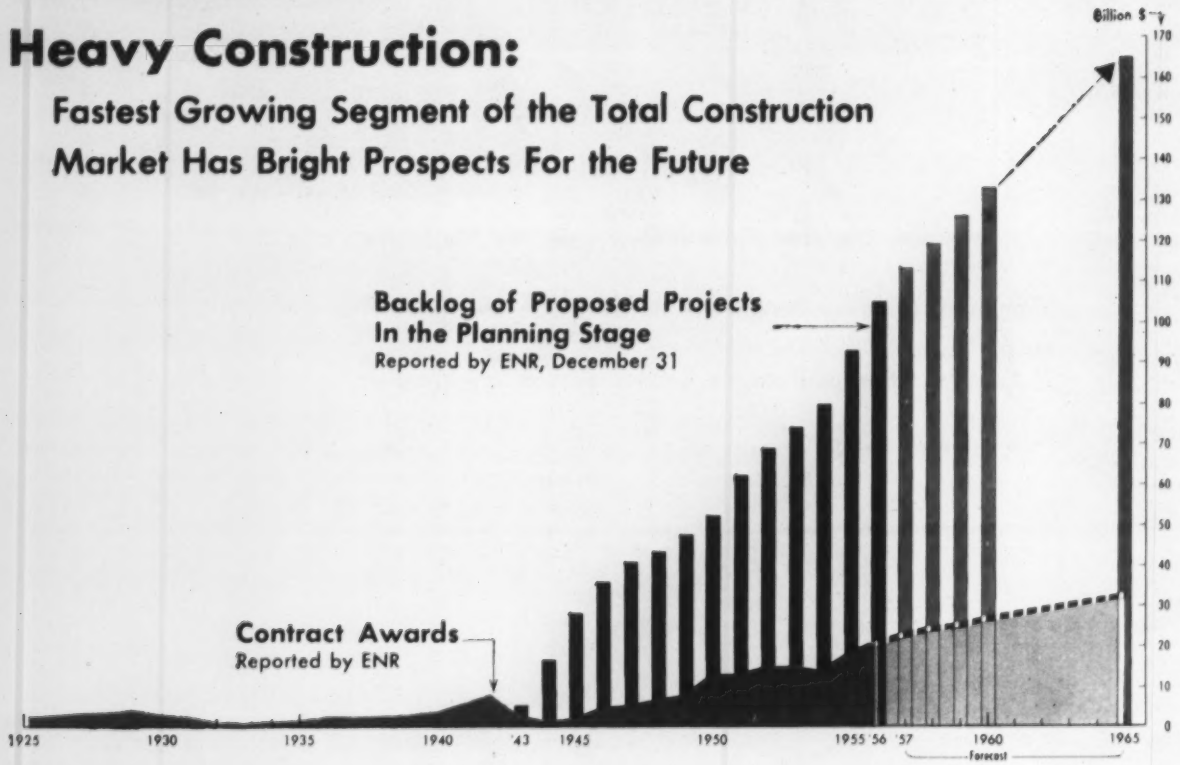
Engineers, of course, cannot combat inflation all by themselves, or even avoid being saddled with increased costs not of their own making. They can only hope that these increases will be moderated in line with the President's plea that "business in its pricing policies avoid unnecessary price increases" and that "increases in wages be reasonably related to improvements in productivity."

On their own part, however, engineers can redouble their efforts to build more with every dollar at their disposal by wise and selective design, by ingenious and efficient construction and by careful management. Engineers who can do that are the kind that are needed.

The old adage that *"Engineering is the art of doing well with one dollar what any bungler can do with two after a fashion"* is well worth remembering in the year ahead. The remarkable progress of construction, detailed in this annual report on the pages that follow, can be maintained and improved upon only if the threat of inflation is successfully turned back.

Heavy Construction:

Fastest Growing Segment of the Total Construction Market Has Bright Prospects For the Future



Construction Boom Flattens Out

Heavy construction's biggest boom roared into 1956 with throttle wide open. On top of a 30% rise in '55, contracts started at a sizzling pace in 1956 with a 32% increase during the first quarter. By the end of June, this pace had slacked to a healthy 21% over 1955. Accenting this six months of "super boom" were 11 weeks with more than $500 million in contracts awarded, a weekly volume matched only twice during 1955.

By mid-year, the strain on supplies of money and credit available to finance this construction, along with record capital equipment purchases by industry and a record level of general business activity, aggravated an already "tight" money market. The results: a deeper slump in housing; tapering off in commercial, state and municipal contracts.

Despite this tapering off of the boom, heavy construction contractors took on more new work in the second half than ever before during the July-December period. And for the entire year they racked up a record $21.7 billion in new contracts, 16% more than 1955's previous high.

Several types of work set new records by wide margins. Most spectacular was industrial building which rocketed 81% above 1955's volume of awards.

Heavy Construction Awards Forecast—1957

Contract awards reported by ENR

Type of Work	1956 Actual	1957 Forecast	% Chg. 1956-1957
	(Millions)		
All heavy Construction	$21,712	$23,128	+ 7
Private	13,490	13,750	+ 2
Public	8,222	9,375	+14
State & Municipal	6,533	7,375	+13
Federal	1,689	2,000	+18
Public			
Waterworks	356	390	+10
Sewerage	579	600	+ 4
Bridges	622*	725	+17
Highways	2,475	3,200	+29
Earthwork, irr., drain.	730	930	+27
Building, Excl housing	2,099	2,000	− 5
Housing	318	330	+ 4
Unclassified	1,053	1,200	+14
Private			
Housing	5,307	6,050	+14
Industrial	5,335	4,800	−10
Commercial	2,051	1,900	− 7
Unclassified	787	1,000	+27

* Includes $10.4 million in private bridges
Note: Figures are in CURRENT DOLLARS. 1957 figures include estimated 3.4% rise in ENR Construction Cost Index and 2.6% rise in ENR Building Cost Index

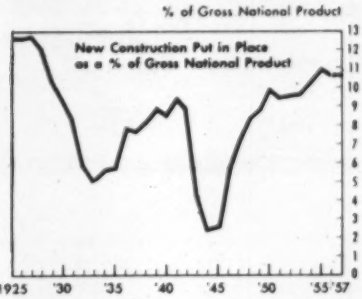
Other record-smashers include: waterworks up 13%; sewerage up 44%; highways up 16%; earthwork-irrigation-drainage up 34%; and commercial building up 24% (see table.)

• **Outlook for '57**—Big as 1956 was, 1957 new business should top it—tight money or no. ENR forecasts a 7% rise in heavy construction contracts to a new record of $23.1 billion. This includes an estimated 2.6-3.4% rise in the ENR Cost Indexes.

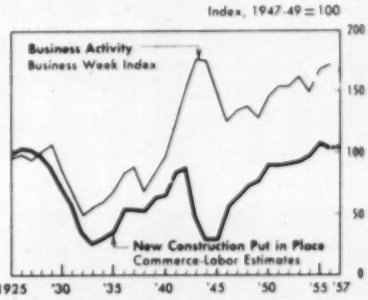
Federally-sponsored construction progams—highways and military housing, are expected to offset the effects of financing troubles which may postpone some private and municipal projects this year.

The '57 outlook is brightest for heavy construction other than building. Excluding building, ENR sees heavy construction increasing 22% to a record $8 billion. Sparking this rise will be: highways up 29%; bridges up 17%; earthwork-irrigation-drainage up 27%; waterworks up 10%; private unclassified up 27% (due to expected rise in pipelines); and public unclassified up 14%

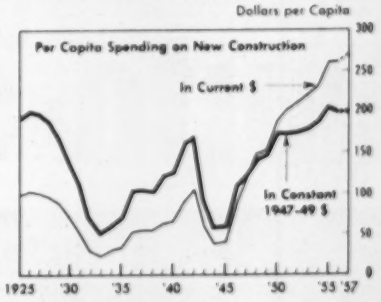
Total New Construction and Its Impact on the National Economy



New construction accounts for 10.8% of total US output (GNP) in 1956.

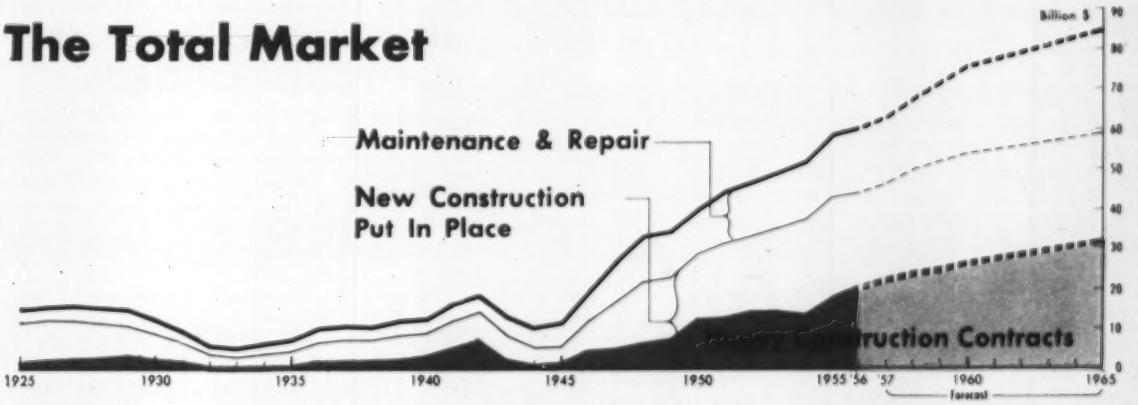

Index, 1947-49 = 100
Business Activity
Business Week Index
New Construction Put in Place
Commerce-Labor Estimates
1925 '30 '35 '40 '45 '50 '55 '57

In "physical" volume per capital, total business rises, but construction dips.



Construction per capita up in current prices, down in constant prices.

The Total Market



(largely due to federal military airport construction.)

Building contracts should about match 1955's record $15.1 billion in awards. Increases of 14% in private mass housing and 4% in public housing are forecast to offset declines of 10% in private industrial building, 7% in commercial building and 5% in public building other than housing.

The rise in private mass housing relies on support from "Capehart" military rental housing and an increase in apartment construction. Moreover, the trend to larger, more expensive dwelling units should sustain dollar volume even though the number of units started declines.

Fewer large stores in new shopping centers will hold down commercial building contracts while public building awards will dip because of less federal work.

Industrial buildings awards are forecast to slack off in '57, but the total is still second highest on record. Several industrial firms recently postponed or announced stretch-outs in part of their plant spending programs. This could help restore greater balance to the construction market in '57 by removing some of the demand for "tight" money and scarce steel.

• **Backlog Growth Supports Rise**—Keystone of ENR's forecast for a further rise in contracts within the limits of available investment capital is the rapid increase in the country's demonstrated need for more heavy construction. This is measured by ENR's backlog of Proposed Heavy Construction, a continuous monthly inventory of projects in planning, each identified as to estimated cost, location and owner.

Heavy construction projects with an estimated cost of $104.2 billion were in the planning stage on December 31, according to the ENR Backlog. This is an $11-billion rise in 12 months and indicates how rapidly our heavy construction needs are rising even though contracts are setting new records. New projects tagged with a total cost $25.6 billion entered the planning stage during '56. Over this same period, jobs valued at $10 billion moved out of the Backlog into contract. These jobs accounted for 46% of total 1956 contracts reported by ENR.

The table on page 64 shows where the current Backlog is by state by type of work. For how this Backlog feeds future contract awards, see page 59.

• **$61-Billion Market**—The total construction market topped $60 billion for the first time in 1956. Of this, new construction put in place accounts for $44.25 billion, according to US Departments of Commerce and Labor estimates. An additional $16.5 billion is estimated for 1956 maintenance and repairs. Altogether, these expenditures account for 15% of total U S output measured by Gross National Product.

New construction put in place again played a dominant role in our economy's growth, but "tight" money kept it from keeping pace with the 1956 rise in total business activity. A 3% increase in estimated new construction compared with a 5% rise in GNP; new construction dipped from 11% of GNP in '55 to 10.8% in '56 (chart, top left.)

Higher prices accounted for the total dollar gain in new construction in '56. In fact, "physical" volume of work put in place actually dipped below 1955's record high. Moreover, per capita spending on new construction dropped 3.6% below 1955, when measured in constant 1947-49 prices (chart, top right.)

For 1957, a further 5% rise in new construction to a new dollar record of $46.4 billion is forecast by the Departments of Commerce and Labor. Adding maintenance and repair spending, items that are forecast at $17 billion, the total construction market this year should set a new high of $63.4 billion.

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All Regions Take Part in the Heavy Construction Boom

All regions of the country took part in the 1956 heavy construction boom. "Hottest" region was the Far West which racked up a 41% increase over 1955 contract volume. Others among the fastest growing heavy construction markets were the South, up 27% over '55, and New England with a 20% gain.

Every region except the South set a new record in dollar value of awards reported by ENR (see charts and tables on opposite page). In fact, the Middle Atlantic chalked up the biggest annual volume ever recorded for any region, $5.6 billion. This was a 12% rise above '55 for the Middle Atlantic states, which dominated the US heavy construction market for the third consecutive year.

In a close race for second place in last year's contract awards derby were the West of the Mississippi, up 8% to $4.4 billion, and the Middle West which had a 10% increase to $4.2 billion in awards.

• **Texas is Top State**—Texas edges New York out of first place in total heavy construction contracts during 1956. The Longhorn state took the lead with $2,194 million in awards, just a whisker above New York's $2,185 million. California was the third largest state with $1,990 million in 1956 awards.

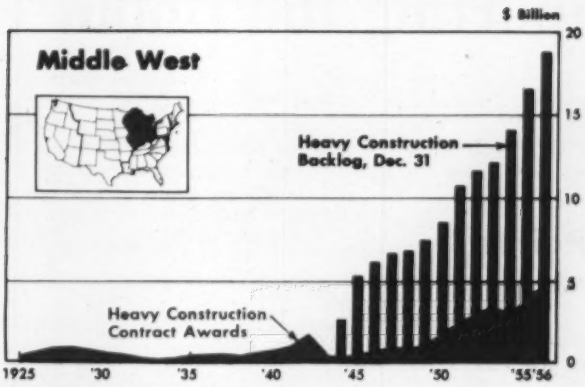
Each state's 1956 contract totals by type of heavy construction are shown in the table on page 60.

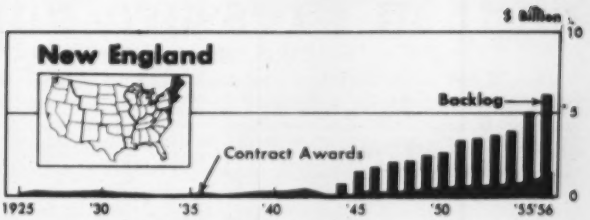
• **Regional Backlogs Rise**—Still greater heights in future contract awards are indicated for all six regions of the country. ENR's Backlog of proposed heavy construction increased in every region during 1956 (see charts and table on opposite page).

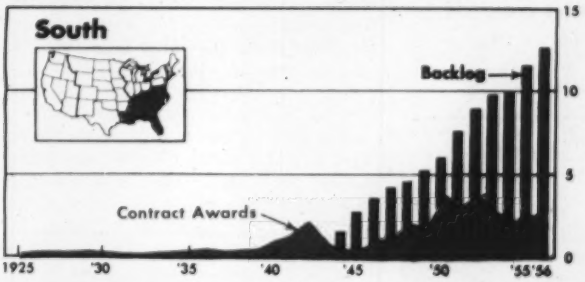
Projects in the planning stage have been piling up fastest in New England and in the Far West. Last year, New England's Backlog rose 29% to $6 billion on December 31. The Far West had a 26% rise to $22 billion.

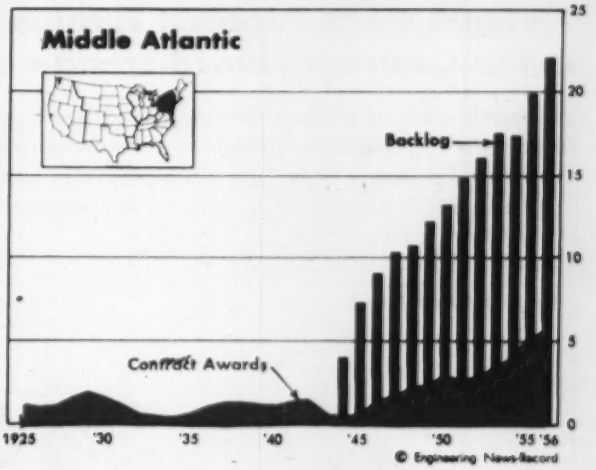
Backlog increases in other regions during '56 range from 9% for the West of the Mississippi to 17% in the Middle West .

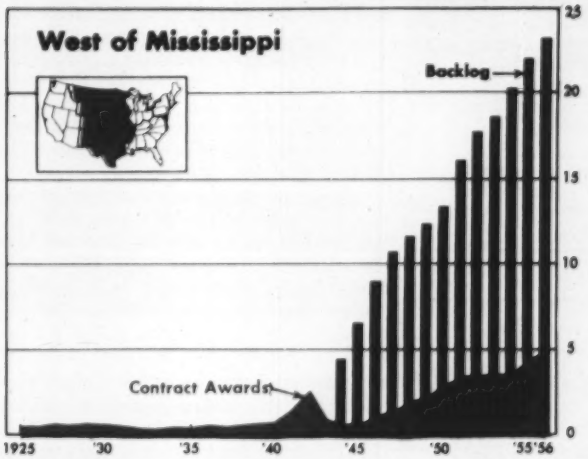
See the Heavy Construction Backlog table on page 64 for the estimated cost of these projects in planning by states by type of work.

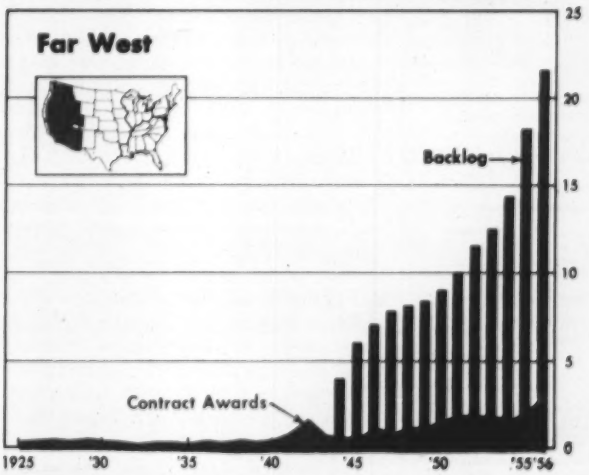

$ Billion
Middle West
Heavy Construction Backlog, Dec. 31
Heavy Construction Contract Awards
1925 '30 '35 '40 '45 '50 '55'56
0 5 10 15 20











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Heavy Construction Contracts by Regions

Reported by ENR in millions

Year	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West
1925	$199	$935	$248	$474	$408	$295
1926	247	856	289	724	415	323
1927	234	989	290	776	593	371
1928	222	1,383	291	809	538	336
1929	238	1,681	330	747	583	371
1930	265	1,288	270	534	490	326
1931	186	989	234	380	396	267
1932	72	404	128	205	236	174
1933	59	298	124	151	225	211
1934	100	274	215	227	310	238
1935	102	442	245	280	295	226
1936	148	776	309	423	445	286
1937	112	1,058	242	423	358	244
1938	149	1,053	300	382	497	410
1939	175	978	454	536	549	310
1940	244	951	853	743	702	493
1941	312	1,211	1,245	909	1,345	847
1942a	467	1,225	1,930	1,588	2,467	1,928
1943b	144	493	673	372	730	739
1944	51	267	278	208	338	587
1945	99	429	307	429	499	527
1946	293	1,228	864	633	1,041	1,117
1947	204	1,537	979	750	1,335	846
1948	323	1,991	1,081	860	1,874	1,092
1949	391	2,098	1,365	1,046	2,098	1,189
1950	497	2,760	3,648	1,845	2,891	1,700
1951	624	2,877	2,760	2,382	3,351	1,912
1952	624	2,645	3,722	3,038c	3,406	1,855
1953	635	3,400	2,523	3,392	3,439	1,781
1954	734	3,844	1,892	2,795	3,435	1,712
1955	927	5,000	2,013	4,188	4,395	2,200
1956	1,108	5,596	2,556	4,625	4,733	2,094

a Regional totals overstated by $1,300 million of contracts of unknown location canceled by War Production Board. b Regional totals do not include $1,387 million for atomic plants. c $400 million removed from total previously reported to correct for cost savings on portsmouth, Ohio, atomic plant.

Heavy Construction Backlog by Regions

Reported by ENR in billions

Year	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West
1944	$0 6	$4 0	$1 3	$2 5	$4 3	$3 9
1945	1 3	7 0	2 5	5 1	6 3	5 8
1946	1 7	8 8	3 4	5 9	8 8	7 0
1947	2 0	10 2	4 2	6 5	10 5	7 7
1948	2 0	10 6	4 5	6 6	11 4	8 0
1949	2 4	12 0	5 2	7 3	12 2	8 3
1950	2 5	13 0	5 9	8 4	13 3	9 0
1951	3 3	14 8	7 4	10 6	16 0	10 1
1952	3 3	15 8	8 8	11 8	17 7	11 6
1953	3 7	17 4	9 7	12 0	18 7	12 5
1954	3 9	17 2	9 9	14 1	20 2	14 4
1955	5 1	19 8	11 4	16 5	22 0	18 2
1956	6 0	22 0	12 5	18 8	22 9	22 1

Shift in Pressure Supporting the Boom

The heavy construction contract boom continues to be supported by growing demands for new, additional and more efficient facilities. This planning for future construction, as measured by ENR's Backlog of Proposed Heavy Construction, has mounted steadily since the end of World War II. Furthermore, in every year since 1945, except 1953 and 1954, the dollar volume of construction contracts for this work has increased. So as long as this backlog of work in the planning stage keeps rising, there is strong prospect of increasing contract awards.

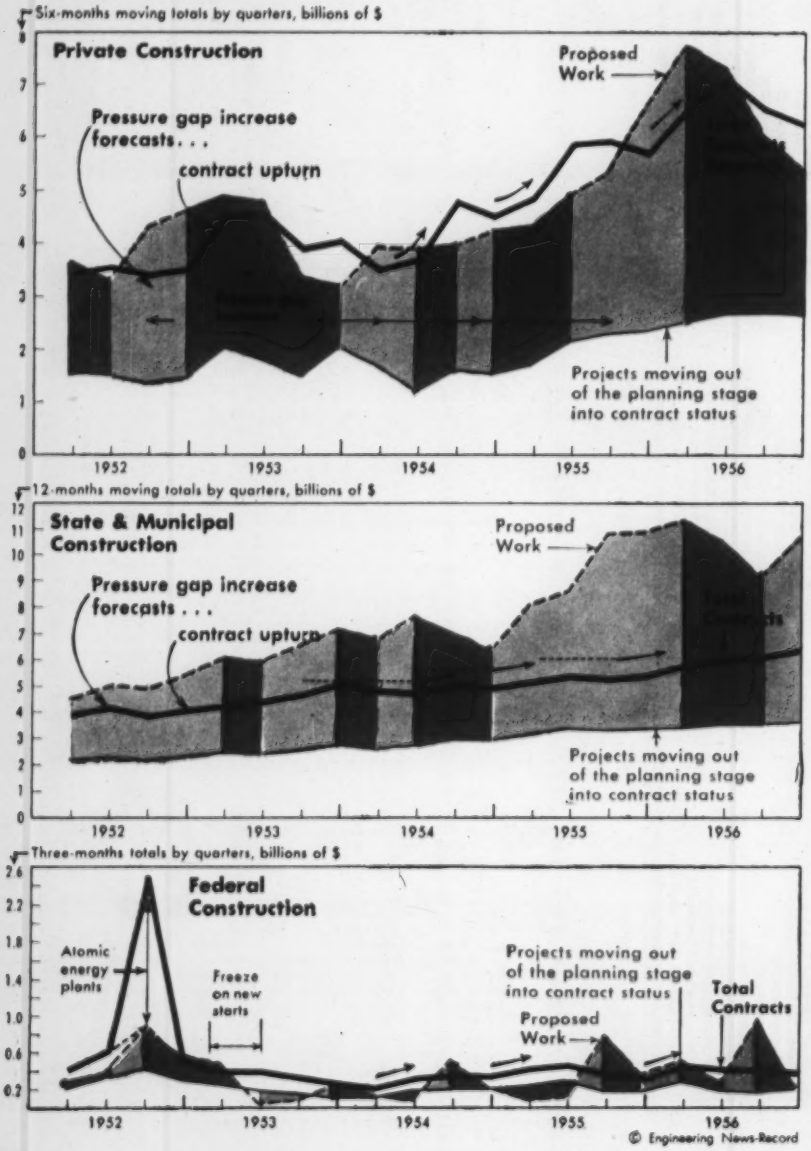
But the upward course of new heavy construction business moves in zigs and zags. Large construction projects often present big problems in planning, financing and contracting. Even more important, however, are shifts in the origin of demand which affect the volume of new business.

During 1956, significant shifts in origin will affect new heavy construction business in 1957. The charts show these shifts for the three types of construction buyers: private business and individuals; state and municipal agencies; and the federal government.

The grey tinted areas on these charts show demand pressure increasing, while the red areas show when this pressure decreases. They flag future changes in construction demand as measured by total contract awards.

Pressure Gaps Forecast Turning Points in the Contract Award Trend—

When the ratio of projects entering the planning stage to projects moving from design to construction contract increases, "pressure is up" for an increase in contract awards ... but when this ratio, or "pressure" decreases, it forecasts a downturn in total contract awards


Six-months moving totals by quarters, billions of $
Private Construction
Proposed Work
Pressure gap increase forecasts . . .
contract upturn
Projects moving out of the planning stage into contract status
1952
1953
1954
1955
1956
12-months moving totals by quarters, billions of $
State & Municipal Construction
Proposed Work
Pressure gap increase forecasts . . .
contract upturn
Projects moving out of the planning stage into contract status
Three-months totals by quarters, billions of $
Federal Construction
Atomic energy plants
Freeze on new starts
Projects moving out of the planning stage into contract status
Proposed Work
Total Contracts
© Engineering News-Record

←Private demand off—The large red area covering the last three quarters of '56 is the signal for a continuing decline in total private awards during the first quarter of this year. So long as this decreasing demand pressure continues, no reversal in the contract awards down-trend can be expected.

Contracts for private construction so far this year confirm the grim forecast of the chart. Awards for the first six weeks of '57 slumped 39% below the same weeks of last year and are well below the rate during the last quarter of '56.

←State and municipal up—Why the heavy construction industry can count on state and municipal projects as the backbone of the year's new business is clear from the chart at the left. Though a prolonged buildup in pressure for more state and local public works during '55 and early '56 was interrupted temporarily last year, the "pressure gap" is once again increasing. This stepped up flow of new work, plus many projects which have been in planning since the 1955-56 upsurge, will keep this construction market strong in 1957.

←Federal to rise—Federal projects often take so long to pass through the planning stage to construction contract that it's more difficult to apply ENR's "pressure gap" analysis for forecasting. However, the successively bigger pressure gaps which show up in 1955 and 1956 point to a continuing rise in federal construction awards.

How ENR's Heavy Construction Backlog Feeds Future Contracts

Heavy construction projects having a total estimated cost of $25,644 million were proposed during 1956, as reported by ENR. They set a new all-time high for the flow of new work into ENR's Heavy Construction Backlog, 7% more than 1955's previous record volume.

At the same time that all of this work was coming along to backstop the heavy construction contract boom, projects costing $9,956 million moved out of the ENR Backlog into contracts. These jobs acounted for 46% or the total dollar value of heavy construction contracts reported by ENR in 1956. In fact, projects originating in the Backlog accounted for a much higher percentage of total public works contract awards: 67% of state and municipal and 54% of total federal contracts reported.

Because the Backlog feeds such a large volume of work into the contract totals, the rate at which proposed jobs build up in the Backlog provides a valuable indicator of future heavy construction contracts. The Backlog total is a monthly inventory of the country's demonstrated needs for heavy construction—now at a record high of $104.2 billion (totals by state by type of work on page 64). Each month new projects are added to the Backlog as they are proposed, while other work moves out of the Backlog into contract. Also removed from the Backlog are projects which checks show as dropped during some stage of planning.

By analyzing the flow of new work into the Backlog compared with the flow out of the Backlog into contract, ENR has developed its "pressure gap" method of forecasting turning points in the contract award trend (ENR August 2, 1956, page 32.) This method spots turning points three to nine months in advance.

For readers interested in testing this method for their own use in forecasting construction markets, the table at the right gives monthly data 1951-56 for the three pressure gap series in the charts at the left.

	Private Construction (Millions of $)			State & Municipal Construction (Millions of $)			Federal Construction (Millions of $)		
	New Proposed Work Flowing into Backlog	Moving Out of Backlog to Contract	Total Contracts Reported	New Proposed Work Flowing into Backlog	Moving Out of Backlog to Contract	Total Contracts Reported	New Proposed Work Flowing into Backlog	Moving Out of Backlog to Contract	Total Contracts Reported
1951 Year	**$10,581**	**$3,485**	**$7,436**	**$4,781**	**$2,308**	**$3,923**	**$3,734**	**$928**	**$2,248**
Jan	1,115	263	683	407	212	301	149	9	284
Feb	2,208	554	932	504	162	266	547	32	72
Mar	681	467	884	514	202	345	350	76	178
Apr	791	285	548	232	138	265	216	74	230
May	845	201	698	550	216	360	182	89	210
Jun	449	248	444	160	254	403	82	91	181
Jul	568	204	397	267	282	533	696	176	448
Aug	1,102	245	601	472	185	377	275	61	167
Sep	740	176	456	468	165	305	576	107	187
Oct	721	257	653	333	135	262	356	90	111
Nov	673	329	638	467	190	285	216	48	102
Dec	658	256	502	387	167	221	119	75	106
1952 Year	**7,979**	**3,031**	**7,113**	**5,453**	**2,344**	**4,075**	**2,121**	**1,388**	**4,101**
Jan	649	339	723	423	191	319	172	75	155
Feb	520	184	414	362	129	222	93	72	152
Mar	453	201	549	458	225	365	28	80	128
Apr	506	241	586	393	235	107	66	131	187
May	942	314	737	471	254	450	170	134	246
Jun	357	269	569	518	213	375	151	104	197
Jul	598	164	606	307	239	450	517	175	1,255
Aug	1,400	260	504	290	134	294	205	87	1,013
Sep	522	131	442	526	140	268	141	187	243
Oct	697	443	788	576	260	414	180	170	244
Nov	608	281	664	669	164	265	171	80	151
Dec	727	204	530	460	160	246	257	71	130
1953 Year	**7,998**	**3,913**	**8,685**	**7,160**	**2,780**	**5,067**	**886**	**750**	**1,418**
Jan	689	588	1,177	798	304	480	448	161	229
Feb	1,013	277	651	633	146	273	12	63	99
Mar	1,173	287	696	447	261	359	45	37	79
Apr	810	267	750	427	278	574	20	90	137
May	445	213	635	317	175	351	23	52	98
Jun	663	245	677	499	213	476	16	57	165
Jul	838	226	664	458	241	433	26	80	166
Aug	387	351	605	1,123	252	414	38	47	92
Sep	266	211	620	170	142	407	8	40	90
Oct	524	437	856	293	304	501	136	70	112
Nov	446	166	405	1,242	156	314	44	29	78
Dec	744	675	929	753	308	505	70	33	76
1954 Year	**8,241**	**2,786**	**8,125**	**8,423**	**2,988**	**6,001**	**937**	**783**	**1,298**
Jan	968	106	350	474	206	335	92	64	81
Feb	785	152	460	355	144	238	36	41	69
Mar	501	180	527	736	225	350	21	27	57
Apr	551	286	873	543	261	465	40	59	102
May	574	291	922	537	244	410	9	55	104
Jun	583	202	599	1,002	251	425	22	87	137
Jul	975	217	834	349	335	550	32	115	191
Aug	531	397	793	454	253	411	157	40	67
Sep	784	226	811	201	299	555	325	62	113
Oct	611	183	523	485	208	354	179	72	119
Nov	491	217	674	895	254	408	22	77	132
Dec	887	299	759	392	308	500	22	64	114
1955 Year	**11,672**	**4,570**	**11,673**	**10,952**	**3,348**	**5,415**	**1,398**	**927**	**1,638**
Jan	726	412	806	951	230	326	28	80	163
Feb	576	177	673	569	207	308	33	56	104
Mar	1,070	438	1,341	1,708	290	490	43	104	156
Apr	939	358	832	1,372	334	489	63	92	128
May	647	410	1,148	712	264	424	29	91	155
Jun	1,033	391	1,106	503	374	588	36	118	188
Jul	622	379	1,026	873	282	446	82	97	212
Aug	1,481	328	742	337	275	437	327	24	61
Sep	688	474	1,118	2,072	306	545	385	73	122
Oct	971	304	994	325	227	401	164	78	131
Nov	1,309	541	965	768	172	294	119	46	110
Dec	1,610	358	921	762	387	667	89	68	105
1956 Year	**12,825**	**5,417**	**13,490**	**10,804**	**3,652**	**6,531**	**2,014**	**887**	**1,889**
Jan	1,041	346	867	1,913	276	531	163	136	194
Feb	1,360	353	1,244	711	240	415	121	76	123
Mar	1,487	641	1,633	998	283	585	222	82	161
Apr	1,247	499	1,266	576	313	502	162	38	100
May	1,554	483	1,287	794	373	640	111	108	183
Jun	670	389	896	447	373	507	23	66	129
Jul	761	680	1,104	609	310	525	7	96	206
Aug	830	410	1,144	565	320	905	758	34	79
Sep	976	281	893	760	237	452	214	49	136
Oct	996	433	1,142	799	396	608	52	56	129
Nov	1,057	391	976	1,846	358	642	59	71	118
Dec	846	511	1,038	786	243	431	122	75	121

Backlog of Proposed Heavy Construction—1944-1956

Reported by Engineering News-Record, in millions of dollars, as of December 31

	Public Works Projects									Private Projects				
Dec. 31	Waterworks	Sewerage	Bridges	Earthwork irr.-drain.	Streets and roads	Buildings	Unclassified	State & Municipal	Federal	Total Public	Industrial buildings	Comm'l buildings	Unclassified	Total Private	Total Public & Private
1944	**$576**	**$947**	**$697**	**$6,487**	**$2,353**	**$2,225**	**$1,993**	**$8,930**	**$6,348**	**$15,278**	**$183**	**$790**	**$364**	**$1,337**	**$16,615**
45	874	1,549	1,141	6,892	3,728	5,805	3,958	15,731	8,226	23,957	1,331	1,901	813	4,045	28,002
46	1,131	1,996	1,258	7,543	4,154	7,480	4,291	18,683	9,170	27,853	2,402	3,545	1,758	7,705	35,558
47	1,155	2,187	1,362	7,598	4,235	8,424	4,779	20,382	9,358	29,740	3,544	4,644	3,051	11,239	40,979
48	1,168	2,180	1,373	7,410	4,005	9,613	4,595	20,953	9,391	30,344	3,939	5,048	3,853	12,840	43,194
49	1,199	2,132	1,478	7,450	4,556	10,868	4,653	22,398	9,938	32,336	4,422	5,780	4,728	14,930	47,266
1950	**1,387**	**2,182**	**1,647**	**7,282**	**4,598**	**12,050**	**4,717**	**24,109**	**9,754**	**33,863**	**5,753**	**6,963**	**5,534**	**18,250**	**52,113**
51	1,432	2,372	1,978	7,444	5,129	13,569	6,507	26,082	11,349	38,431	9,400	7,994	6,322	23,716	62,147
52	1,533	2,762	2,217	7,983	5,614	14,737	6,634	28,411	13,069	41,480	10,593	9,439	7,216	27,248	68,728
53	1,582	2,902	2,288	8,601	7,315	14,994	6,728	31,739	12,671	44,410	10,716	11,306	7,624	29,646	74,056
54	1,647	2,916	2,261	9,334	8,599	15,111	6,677	34,184	12,361	46,545	11,740	12,947	8,470	33,157	79,702
1955	**1,990**	**2,988**	**2,682**	**11,293**	**11,313**	**16,405**	**7,246**	**41,176**	**12,741**	**53,917**	**14,302**	**15,767**	**9,067**	**39,136**	**93,053**
56	2,229	3,214	2,954	11,416	12,672	18,884	9,244	46,971	13,642	60,613	16,139	18,210	9,288	43,637	104,250

Construction Contracts Boom to Record $21.7 Billion in 1956

Total heavy construction contracts rise 16% over '55 as all regions share in the boom and new records are set for industrial building, commercial building, water-works, sewerage, highways and earthwork-irrigation-drainage.

Thousands of Dollars (000 omitted)

States	Public Works Contracts: Water-works	Sewerage	Bridges*	Earthwork irr.-drain.	Streets and roads	Buildings: Residential	Buildings: Other	Unclassified†	Federal government work	Private Contracts: Commercial Buildings: Industrial buildings	Commercial Buildings: Residential	Commercial Buildings: Other	Construction: Private	Construction: Public	1956 Total	1955 Total	% Change '55-'56
UNITED STATES																	
1956	**356,483**	**378,796**	**621,917**	**729,823**	**2,474,813**	**317,779**	**2,099,455**	**1,840,777**	**1,888,678**	**5,334,782**	**5,306,784**	**2,051,103**	**13,490,380**	**8,221,631**	**21,711,981**		**+16**
1955	314,187	401,859	545,563	546,123	2,136,669	246,159	1,740,505	2,046,078	1,634,757	2,950,778	6,138,412	1,655,549	11,672,059	7,049,793		18,721,852	
% Change	+13	+44	+14	+34	+16	+29	+21	−10	+3	+81	−14	+24	+16	+17	+16		
NEW ENGLAND																	
Me.		491	2,326	1,928	14,055		5,606	22,270	22,828	10,279	858	4,592	17,154	45,251	**62,405**	64,923	−4
N. H.	370	109	980	3,659	18,900	353	4,455	7,385	9,337	9,410	2,153	2,187	15,362	34,599	**49,961**	41,749	+20
Vt.	128	380	232	3,585	6,927		4,386	934	5,540	225	1,290	3,507	5,022	16,572	**21,594**	20,629	+5
Mass.	3,865	9,043	19,767	21,937	65,146	2,825	77,516	32,741	44,776	103,910	89,124	64,025	259,079	230,820	**489,899**	521,249	−6
R. I.	173	7,679	5,676	661	6,763	2,114	6,579	8,003	11,384	3,550		10,917	14,576	37,648	**52,224**	75,532	−31
Conn.	2,536	10,040	55,700	3,511	143,174	2,110	44,549	9,352	13,145	53,350	47,312	60,518	161,613	270,538	**432,151**	202,572	+113
1956	**7,082**	**27,742**	**84,681**	**35,281**	**254,965**	**7,402**	**143,091**	**80,685**	**107,000**	**180,842**	**140,737**	**145,746**	**472,806**	**835,429**	**1,108,234**		**+20**
1955	12,291	17,012	45,596	11,224	237,926	12,667	118,218	134,739	132,772	135,982	140,888	60,111	345,631	581,023		926,654	
% Change	−43	+63	+86	+214	+7	−42	+21	−40	−20	+33	0	+142	+37	+9	+20		
MIDDLE ATLANTIC																	
N. Y.	25,031	46,399	36,024	109,817	190,096	81,622	285,093	145,523	111,744	124,431	649,355	491,979	1,288,571	896,769	**2,185,340**	2,321,743	−6
N. J.	2,570	17,878	17,855	5,900	25,237	4,186	44,835	34,197	36,216	240,373	772,674	182,229	1,203,269	144,665	**1,347,934**	858,480	+57
Pa.	20,449	101,011	30,138	12,758	93,071	9,695	91,781	25,461	33,826	383,167	409,134	119,202	916,153	379,714	**1,295,867**	1,050,528	+23
Md.	10,232	15,209	10,547	3,995	44,987	4,251	64,997	46,610	46,194	223,251	94,414	31,690	349,355	200,828	**550,183**	450,495	+22
D. C.		12,369	3,103	868	6,636	8,007	12,480	3,415	11,272	7,339	24,094	23,946	57,379	44,878	**102,257**	104,370	−2
Del.	1,059	1,533	421	1,036	12,834		14,208	3,223	3,686	10,779	59,512	9,617	80,828	33,394	**114,222**	213,892	−47
1956	**59,341**	**194,399**	**98,088**	**134,374**	**372,861**	**107,781**	**513,364**	**258,429**	**242,938**	**999,340**	**2,009,183**	**858,663**	**3,895,555**	**1,700,248**	**5,595,803**		**+12**
1955	73,901	101,764	112,756	182,389	338,172	98,465	351,713	290,065	214,162	722,696	2,179,610	547,977	3,477,719	1,521,789		4,999,508	
% Change	−20	+91	−13	−26	+10	+9	+46	−11	+13	+37	−8	+57	+12	+12	+12		
SOUTH																	
Va.	2,417	12,953	10,212	1,721	62,630	19,140	33,219	47,150	64,488	108,513	69,579	36,095	223,085	180,544	**403,629**	321,347	+26
W. Va.	87	3,349	4,099	25,193	12,299		2,844	6,256	29,042	228,769	863	1,664	232,506	52,917	**285,423**	134,270	+113
N. C.	12,580	11,333	10,302	2,367	35,772	4,714	19,050	15,499	28,676	7,935	22,560	7,939	39,710	110,251	**149,961**	134,983	+11
S. C.	1,016	373	6,228	1,342	21,208	490	12,467	21,223	25,265	24,681	363	3,967	29,329	64,029	**93,358**	115,992	−20
Ga.	99		1,827	1,546	32,261	1,682	31,151	12,172	24,176	5,000	1,236	1,444	7,680	80,738	**88,418**	184,772	−52
Fla.	4,751	10,254	18,739	12,408	75,054	1,086	32,197	68,311	65,209	61,861	119,238	17,359	201,582	219,676	**421,258**	240,441	+75
Ala.	5,125	3,663	6,419	10,238	36,758	1,006	18,637	13,378	30,342	216,731	10,369	10,505	240,154	92,075	**332,829**	199,703	+67
Miss.		377	2,315	4,808	13,928		1,019	9,442	12,185	39,000		795	45,805	25,879	**71,684**	42,530	+69
La.	3,954	6,790	49,422	25,194	35,702	1,418	36,245	23,234	32,522	132,619	4,332	17,375	158,108	178,177	**336,285**	233,547	+44
Ky.	4,980	16,072	1,067	23,200	27,511	9,772	13,242	16,391	40,404	55,434	11,905	19,547	94,796	104,325	**199,121**	246,684	−19
Tenn.	899	9,722	5,422	10,955	37,095	4,233	74,554	7,093	43,342	14,665	775	8,826	28,217	146,022	**174,239**	158,289	+10
1956	**35,908**	**74,886**	**116,052**	**118,972**	**390,218**	**43,541**	**274,625**	**240,059**	**395,851**	**895,208**	**241,220**	**125,516**	**1,300,972**	**1,255,233**	**2,556,205**		**+27**
1955	22,508	53,394	93,850	85,296	318,068	34,590	313,202	394,592	410,915	407,694	183,163	106,201	891,195	1,113,363		2,012,558	
% Change	+60	+40	+24	+39	+23	+26	−13	−39	−4	+120	+32	+18	+46	+13	+27		
MIDDLE WEST																	
Ohio	28,755	41,034	2,154	6,984	162,956	1,885	80,476	82,182	54,443	470,139	282,547	129,845	916,176	372,781	**1,288,957**	1,133,518	+14
Ind.	1,528	5,457	9,386	949	22,823	21,273	39,605	8,841	7,060	643,350	84,314	26,748	754,761	109,513	**864,274**	444,891	+94
Ill.	18,617	33,348	77,868	9,211	100,847	20,450	98,888	26,186	25,863	321,252	267,913	108,614	704,252	378,942	**1,083,194**	1,391,758	−22
Wis.	5,353	19,484	6,381	1,035	61,906	1,820	38,390	11,995	5,056	72,825	13,124	23,797	115,213	140,897	**256,110**	251,142	+2
Mich.	12,326	35,892	30,894	10,892	106,221	15,825	153,809	26,019	23,065	118,687	544,187	77,605	750,619	381,738	**1,132,357**	966,518	+17
1956	**66,579**	**135 215**	**126,683**	**29,071**	**454,753**	**61,253**	**411,168**	**155,223**	**115,487**	**1,626,253**	**1,192,085**	**366,609**	**3,241,021**	**1,383,871**	**4,624,892**		**+10**
1955	71,859	107,402	74,615	15,350	392,508	46,363	293,414	141,643	113,199	864,388	1,749,269	430,926	3,097,942	1,089,885		4,187,827	
% Change	−7	+26	+70	+89	+16	+32	+40	+10	+2	+88	−32	−15	+5	+27	+10		
WEST OF MISSISSIPPI																	
Minn.	4,189	17,001	6,928	2,708	71,222	3,960	67,711	16,934	9,645	41,508	5,934	28,846	84,976	182,055	**267,031**	293,236	−9
Iowa	2,306	3,169	19,535	6,962	59,658	5,725	17,584	7,419	8,754	40,001	13,894	14,832	71,286	119,799	**191,085**	203,322	−6
Mo.	8,799	4,339	17,272	12,566	40,825	3,356	43,536	16,922	35,950	49,095	164,038	73,888	291,781	142,855	**434,636**	475,720	−9
Ark.	1,989		3,296	9,112	25,763		3,504	6,329	13,772	80,529	25,038	347	107,984	47,923	**155,907**	49,152	+117
N. D.	4,149	1,624	1,317	5,352	23,670	1,952	4,242	33,276	29,920	1,466	1,902	3,509	16,150	66,309	**82,459**	62,093	+33
S. D.	920	453	3,919	18,430	23,722		6,906	22,294	37,310	1,348	988	1,979	10,521	70,438	**80,959**	75,350	+7
Neb.	3,980	1,033	3,270	10,423	22,668	2,889	37,738	18,961	19,848	38,343	3,250	8,595	58,945	95,205	**151,150**	134,318	+13
Kan.	4,261	6,307	8,481	15,850	39,876	5,614	28,062	14,442	36,115	51,085	15,654	12,488	83,334	118,786	**202,120**	328,947	−39
Okla.	12,417	5,798	8,330	4,559	51,129	3,267	20,115	37,625	20,376	42,676	3,028	17,545	84,685	121,804	**206,489**	139,256	+48
Tex.	43,818	33,528	27,371	29,680	205,032	18,469	118,837	280,010	82,340	511,341	778,812	147,050	1,644,123	549,825	**2,193,948**	2,156,805	+2
Mont.		1,927	4,352	2,505	28,631	2,833	7,493	46,373	15,128	12,271	384	6,704	55,105	58,368	**113,473**	151,853	−25
Wyo.	685	314	706	6,205	18,892		6,514	6,485	10,832	31,500	495	2,652	38,400	36,048	**74,448**	40,097	+86
Colo.	52,953	4,523	3,163	694	38,018	15,714	22,220	61,243	74,805	30,125	205,532	35,765	274,449	195,501	**469,950**	225,089	+109
N. M.	474	488	952	8,647	25,444	5,624	11,821	43,847	45,675	9,200	2,332		30,462	78,367	**108,829**	60,210	+81
1956	**140,940**	**80,504**	**108,892**	**133,893**	**674,550**	**69,403**	**396,283**	**612,160**	**440,464**	**940,578**	**1,221,291**	**354,200**	**2,849,201**	**1,983,283**	**4,732,484**		**+8**
1955	92,750	66,955	138,735	96,928	610,545	26,112	366,967	681,660	436,398	606,910	1,331,145	377,041	2,726,494	1,668,954		4,395,448	
% Change	+52	+20	−22	+38	+10	+166	+8	−10	+1	+55	−8	−6	+5	+13	+8		
FAR WEST																	
Idaho	270	916	1,603	4,661	17,564	880	13,939	19,092	22,841	550	500	1,132	17,628	43,488	**61,116**	107,915	−43
Utah	7,169	2,928	803	6,264	11,642	658	10,742	13,494	12,632	7,472	1,500	28,686	47,547	43,811	**91,358**	77,445	+18
Ariz.	558		606	7,579	23,574	2,533	11,793	30,860	25,984	87,890	13,477	4,357	126,169	57,058	**183,227**	57,552	+218
Nev.		252	388	304	12,523		6,450	5,644	6,259	250		1,995	4,134	23,672	**27,806**	33,709	−18
Wash.	7,065	3,903	19,258	140,824	41,556	15,427	59,504	112,744	75,535	93,993	27,952	19,450	225,437	316,239	**541,676**	295,218	+83
Ore.	1,100	1,996	20,094	15,847	25,530	4,521	15,936	36,829	29,795	64,453	5,907	7,396	101,665	97,944	**199,609**	140,665	+42
Calif.	30,452	56,054	44,769	102,653	194,877	4,400	242,560	275,558	214,092	447,953	452,942	137,353	1,208,215	781,356	**1,989,571**	1,487,353	+34
1956	**46,623**	**68,049**	**87,521**	**278,132**	**327,266**	**28,419**	**360,924**	**494,221**	**387,138**	**702,581**	**502,278**	**200,369**	**1,730,795**	**1,363,568**	**3,094,363**		**+41**
1955	40,848	55,332	79,690	155,557	239,360	27,962	296,991	403,379	327,311	213,108	554,337	133,293	1,125,078	1,074,779		2,199,857	
% Change	+14	+19	+10	+78	+37	+2	+22	+23	+18	+230	−9	+50	+54	+27	+41		
CANADA																	
1956	**29,895**	**48,134**	**45,294**	**188,593**	**140,814**	**67,199**	**177,833**	**496,648**	**185,384**	**543,213**	**223,908**	**150,143**	**1 346,449**	**764,212**	**2,110,661**		**−2**
1955	22,556	23,593	49,047	163,439	117,010	74,661	171,896	280,622	186,382	435,375	686,396	134,877	1,454,764	704,708		2,159,472	
% Change	+28	+104	−7	+15	+20	−10	+3	+77	−1	+25	−67	+11	−7	+8	−2		

*Incl. private: Bridges, public, $611,551 ('56) $542,835 ('55); private, $10,366 ('56) $2,728 ('55) † Unclassified, public, $1,053,462 ('56) $1,121,486 ('55); private, $787,315 ('56) $924,592 ('55)

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Heavy Construction Contract History 1925-56

Value in millions of dollars and as percent of U. S. total, reported by Engineering News-Record

Year	Waterworks	%	Sewers	%	Bridges	%	Earthwork, irrigation drainage	%	Highways	%	Buildings: Public	%	Buildings: Industrial	%	Buildings: Commercial: Total Commercial	%	Buildings: Commercial: Mass Housing	%	Buildings: Commercial: Other Commercial	%	Unclassified	%	TOTAL	ENR Volume Index[a]
1925	$ 71	2.8	$ 85	3.3	$ 70	2.7	$ 62	2.4	$423	16.5	$204	8.0	$228	8.9	$1,176	46.0	....	....	....	....	$240	9.4	$2,559	201
1926	62	2.2	104	3.6	87	3.1	55	1.9	486	17.1	227	7.9	312	11.0	1,277	44.7	....	....	....	....	244	8.5	2,854	228
1927	54	1.7	118	3.6	144	4.4	68	2.1	528	16.2	254	7.8	321	9.9	1,398	43.0	....	....	....	....	368	11.3	3,254	267
1928	100	2.8	101	2.8	133	3.7	74	2.1	617	17.3	292	8.1	355	9.9	1,596	44.6	....	....	....	....	313	8.7	3,579	287
1929	49	1.2	88	2.2	137	3.5	77	1.9	542	13.8	356	9.0	547	13.8	1,670	42.4	....	....	....	....	484	12.2	3,950	317
1930	49	1.5	83	2.6	131	4.1	77	2.4	585	18.5	356	11.2	331	10.5	1,034	32.6	....	....	....	....	528	16.6	3,173	260
1931	57	2.3	73	3.0	116	4.8	143	5.9	545	22.4	384	15.8	166	6.8	561	23.1	....	....	....	....	387	15.9	2,432	225
1932	35	2.9	25	2.0	84	6.9	101	8.3	380	31.1	241	19.8	93	7.6	166	13.6	....	....	....	....	95	7.8	1,219	133
1933	67	6.3	22	2.1	98	9.2	137	12.8	288	27.0	121	11.3	152	14.2	106	9.9	....	....	....	....	77	7.2	1,068	107
1934	92	6.7	61	4.5	99	7.3	266	19.6	345	25.4	204	15.0	105	7.7	81	6.0	....	....	....	....	107	7.8	1,361	120
1935	81	5.1	100	6.3	98	6.2	259	16.3	325	20.4	298	18.7	172	10.8	109	6.8	....	....	....	....	148	9.3	1,590	143
1936	92	3.8	121	5.1	188	7.9	182	7.6	483	20.3	436	18.3	309	12.9	275	11.5	....	....	....	....	300	12.6	2,387	201
1937	104	4.3	95	3.9	133	5.5	110	4.5	415	17.0	333	13.7	477	19.6	460	18.8	$324	13.3	$136	5.5	309	12.7	2,438	189
1938	131	4.7	136	4.9	135	4.8	268	9.6	638	22.8	503	18.0	152	5.5	550	19.7	416	14.9	134	4.8	279	10.0	2,792	213
1939	163	5.4	160	5.3	151	5.0	233	7.8	644	21.4	593	19.7	283	9.4	388	12.9	273	9.1	115	3.8	390	13.0	3,003	228
1940	70	1.8	91	2.3	120	3.0	234	5.9	678	17.0	1,196	30.0	594	14.9	400	10.0	269	6.7	131	3.3	603	15.1	3,987	299
1941	77	1.3	89	1.5	112	1.9	245	4.2	583	9.9	2,786	47.4	496	8.5	486	8.3	376	6.4	110	1.9	996	17.0	5,869	430
1942	151	1.6	118	1.3	50	0.5	251	2.7	531	5.7	5,678	61.1	200	2.2	292	3.1	279	3.0	13	0.1	2,034	21.8	9,306[b]	546
1943	46	1.5	41	1.3	26	0.9	47	1.5	227	7.4	1,419	46.4	167	5.5	231	7.5	229	7.5	2	....	858	28.0	3,062[c]	204
1944	33	1.9	32	1.8	17	1.0	64	3.7	196	11.3	658	38.2	174	10.0	140	8.1	132	7.6	8	0.5	416	24.0	1,730	110
1945	61	2.7	35	1.5	53	2.3	57	2.5	227	9.9	463	20.4	635	27.7	387	16.9	253	11.1	134	5.8	371	16.2	2,289	146
1946	109	2.1	114	2.2	129	2.5	328	6.3	769	14.9	414	8.0	1,113	21.5	1,846	35.7	1,518	29.3	328	6.4	354	6.8	5,176	298
1947	139	2.5	175	3.1	196	3.5	327	5.8	794	14.0	615	10.9	862	15.2	1,898	33.5	1,578	27.9	320	5.6	652	11.5	5,659	271
1948	209	2.9	228	3.2	303	4.2	519	7.2	996	13.8	1,161	16.1	1,096	15.2	1,888	26.1	1,359	18.8	529	7.3	820	11.3	7,219	304
1949	207	2.5	277	3.4	357	4.4	524	6.4	897	11.0	1,736	21.3	950	11.7	2,406	29.4	1,833	22.4	573	7.0	803	9.8	8,157	345
1950	215	1.6	287	2.2	369	2.8	417	3.1	1,268	9.5	3,754	28.1	1,683	13.6	4,092	30.7	3,117	23.4	975	7.3	1,256	9.4	13,342	549
1951	209	1.5	335	2.5	316	2.3	505	3.7	1,167	8.6	2,701	19.9	4,124	30.3	2,632	19.3	2,032	14.9	600	4.4	1,617	11.9	13,605	522
1952	231	1.5	304	2.0	413	2.7	496	3.2	1,397	9.2	4,499[d]	29.4	2,722	17.8	3,845	25.2	3,002	19.7	843	5.5	1,381	9.0	15,289[d]	577
1953	247	1.6	431	2.8	752	5.0	375	2.5	1,792	11.8	2,112	13.9	3,178	21.0	4,621	30.4	3,464	22.8	1,157	7.6	1,662	11.0	15,171	506
1954	245	1.7	388	2.7	510	3.5	339	2.4	1,919	13.3	2,017	14.0	1,876	13.0	5,653	39.2	4,232	29.4	1,421	9.8	1,465	10.2	14,412	481
1955	314	1.7	402	2.1	545	2.9	546	2.9	2,137	11.4	1,987	10.6	2,951	15.7	7,794	41.5	6,138	32.7	1,656	8.8	2,046	10.9	18,722	600
1956	356	1.6	579	2.7	622	2.9	730	3.3	2,475	11.4	2,417	11.1	5,335	24.6	7,358	33.9	5,307	24.4	2,051	9.5	1,841	8.5	21,712	671

[a] 1913=100
[b] Total overstated by $1,300 million of contracts canceled by War Production Board.
[c] Excludes $1,367 million for atomic plants.
[d] $400 million removed from total previously reported to correct for cost savings on Portsmouth, Ohio, atomic plant.

Building Construction Contracts 1947—56

Reported by ENR, in millions of dollars

	Private Mass Housing: One-Family	Apartments	Hotels & Motels	Institutions	Total	Public Mass Housing: State & Mun. Slum Clearance	State & Mun. Other	Federal Military	Total	Public, Excluding Housing: State and Mun.	Federal: Industrial	Federal: Other	Total
1947	$979	$568	$17	$14	$1,578	$30	$47	$35	$111	$316	$16	$172	$504
48	881	436	20	22	1,359	112	36	26	174	659	1	328	988
49	1,187	595	18	34	1,823	260	53	55	367	889	247	232	1,388
1950	2,186	789	89	53	3,117	282	56	21	359	1,111	2,072	212	3,395
51	1,774	209	20	29	2,032	552	25	67	644	1,213	582	262	2,057
52	2,676	252	36	37	3,002	478	25	103	606	1,131	2,471	291	3,893
53	3,107	257	49	51	3,464	308	38	29	376	1,328	276	132	1,736
54	3,758	381	46	47	4,232	150	57	47	255	1,492	183	87	1,762
1955	5,650	364	38	87	6,138	127	57	62	246	1,343	240	158	1,741
56	4,812	328	65	102	5,307	119	112	87	318	1,822	124	153	2,099

Note: Parts may not add up to totals because of rounding

Industrial Building Contracts Set Record

Reported by ENR, in thousands of dollars

Industry	1953 No.	1953 Value	1954 No.	1954 Value	1955 No.	1955 Value	1956 No.	1956 Value
Transportation Service								
Railroad	64	$27,620	18	$10,485	16	$8,911	22	$17,221
Automotive	240	55,515	152	41,393	121	39,918	121	36,528
Public Utilities	123	700,921	87	348,037	108	729,248	150	1,201,312
Process Industries[1]	551	917,737	414	728,686	459	1,174,462	549	1,785,691
Food Industries[2]	368	151,580	407	180,357	227	108,181	319	156,033
Metal Refining & Rolling	37	573,287	24	72,939	30	116,731	55	927,117
Metal Working Plants								
Auto	33	282,935	27	36,065	32	174,826	28	288,359
Aircraft	38	29,105	35	41,855	51	79,289	79	161,987
Foundries	17	2,191	8	1,687	10	3,747	10	7,089
Mach. & Mach. Parts	471	186,086	369	218,806	355	271,923	537	483,605
Radio, TV & Electronics	28	24,801	17	5,901	26	20,417	25	17,384
Textiles (excl. rayon)	91	27,845	45	20,185	37	29,117	19	7,464
Wood Industries	55	8,568	49	13,638	41	13,912	26	30,809
Miscellaneous								
General Factories	866	181,350	595	153,667	559	218,713	642	212,923
Refrig. & Cold Stor.	16	8,519	10	2,608	9	1,383	4	1,240
Total, priv. financed	2,998	$3,178,129	2,257	$1,876,309	2,082	$2,950,778	2,586	$5,334,782
Fed. Owned Plants	190	$276,037	151	$183,260	145	$240,144	135	$124,534

[1] Includes distilleries. [2] Includes breweries, frozen food plants and lockers.

Unclassified Contracts Decline in 1956

Reported by ENR, in thousands of dollars

	1952	1953	1954	1955	1956
Private					
Transmission Lines	$85,428	$54,233	$39,082	$50,848	$39,862
Pipelines	185,565	525,933	379,146	324,287	261,672
Railroads	35,553	39,501	12,296	47,462	34,497
Telephone	41,686	22,783	20,152	36,507	15,886
Drive-in Theatres	6,807	2,938	7,786	1,730	919
Radio & TV	5,154	15,899	5,833	4,727	8,063
Airports	20,870	9,786	1,145	4,695	13,890
Other[1]	145,737	186,096	119,558	454,316	412,526
Total Private	526,800	857,169	584,998	924,892	787,315
Public—Federal					
Airports, Airbases	96,673	125,821	171,806	190,150	130,371
Hangars, Buildings	242,457	248,402	240,620	286,943	218,499
Airport Housing	99,797	25,736	28,240	49,676	78,313
Airport Facilities & Util	128,724	85,179	95,556	133,002	142,864
Shipyards	33,707	38,627	5,787	17,822	19,318
Other	113,070	68,516	94,000	135,174	150,166
Total Federal	714,428	592,281	636,009	812,767	739,531
Public—State & Municipal					
Airports	46,400	41,251	25,904	50,957	97,313
Subways, Tunnels	25,360	36,310	92,084	123,222	82,366
Other	68,510	135,483	125,570	134,540	134,252
Total State & Municipal	140,270	213,044	243,558	308,719	313,931
Total Public	854,698	805,325	879,567	1,121,486	1,053,462
Total Unclassified	$1,381,498	$1,662,494	$1,464,565	$2,046,078	$1,840,777

[1] Includes private-owned hydro-electric power plants.

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Future Construction Planned: $104 Billion Backlog, December '56

Engineering construction, plans underway but construction contract not yet awarded, kept growing in 1956.

Summary of projects on file with ENGINEERING NEWS-RECORD covering proposed construction estimated to cost these minimum amounts or more: waterworks, excavation and irrigation, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, public and private, $344,000.

New projects proposed during 1956	**(millions) $25,644**	**Projects abandoned and removed from backlog**	**(millions) $4,493**
Projects moved out of backlog into contracts	**" 9,956**	**Net increase in backlog during 1956**	**" 11,199**

Thousands of dollars (000 omitted), December 31, 1956

States	Public Works Projects: Water-works	Sewer-age	Bridges (includes private)	Earth-work irr.-drain	Streets and roads	Buildings	Unclassified	Federal government work	Private Projects: Industrial building	Comm'l buildings	Unclassified	Construction: Private	Public	1956 TOTAL	1955 TOTAL	% Change '55-'56
UNITED STATES																
1956	**2,228,871**	**3,213,841**	**3,042,825**	**11,416,584**	**12,872,205**	**18,883,688**	**9,243,719**	**13,842,025**	**16,139,231**	**18,209,888**	**9,198,708**	**43,636,557**	**80,612,583**	**104,249,140**	.....	**+12**
1955	1,990,206	2,988,101	2,760,186	11,292,827	11,313,089	16,405,054	7,245,770	12,740,719	14,302,163	15,766,922	8,989,103	39,136,239	53,917,182	.....	93,053,421	....
% Change	+12	+8	+10	+1	+12	+15	+28	+7	+13	+15	+2	+11	+12	+12	.....	....
NEW ENGLAND																
Me.	450	5,564	7,206	2,264	64,133	41,265	91,791	75,128	23,919	33,975	12,365	70,259	212,682	**282,941**	235,575	+20
N. H.	3,330	4,848	37,369	1,243	9,125	37,624	28,039	20,627	10,379	34,344	10,304	55,027	121,578	**176,605**	176,176	+ 1
Vt.	2,031	1,371	1,304	84,492	29,767	27,892	7,439	88,848	2,955	9,750	3,308	16,013	154,296	**170,309**	163,411	+ 4
Mass.	27,522	56,153	104,198	30,934	1,228,612	655,082	232,788	213,224	147,420	242,136	101,643	491,199	2,335,289	**2,826,488**	2,820,250	+0.2
R. I.	6,574	31,953	33,500	2,287	58,871	102,138	46,313	75,901	48,841	51,621	27,359	141,321	287,975	**409,296**	398,072	+ 3
Conn.	16,030	81,406	117,625	115,891	239,442	584,070	57,723	136,212	220,462	613,808	68,895	903,645	1,211,707	**2,115,352**	1,259,970	+68
1956	**55,946**	**181,295**	**301,041**	**237,111**	**1,629,950**	**1,448,071**	**464,093**	**609,940**	**453,976**	**985,634**	**223,874**	**1,677,464**	**4,303,527**	**5,980,991**	.....	**+18**
1955	50,975	138,380	219,603	206,717	1,613,599	1,186,695	408,426	555,951	359,976	697,440	171,643	1,242,789	3,810,665	.....	5,053,454	....
% Change	+10	+31	+37	+15	+1	+22	+14	+10	+26	+41	+30	+35	+13	+18	.....	....
MIDDLE ATLANTIC																
N. Y.	217,322	322,781	521,668	304,530	895,028	2,594,822	1,476,988	427,751	904,992	2,388,709	207,194	3,508,691	6,325,343	**9,834,034**	9,401,269	+ 5
N. J.	122,052	98,124	127,023	60,164	1,253,989	682,486	290,138	109,290	557,446	705,005	123,864	1,387,516	2,632,775	**4,020,291**	3,310,285	+21
Pa.	45,688	143,634	153,589	289,570	845,158	1,026,411	418,802	402,796	949,088	1,077,526	234,126	2,264,870	2,918,722	**5,183,592**	4,544,873	+14
Md.	55,327	20,133	7,641	67,176	554,890	320,139	176,663	246,385	247,535	236,888	88,283	572,706	1,201,969	**1,774,675**	1,404,812	+26
D. C.	5,809	5,394	57,440	1,998	15,733	407,693	44,424	363,001	999	294,683	992	296,674	538,491	**835,165**	778,414	+ 7
Del.	2,035	9,622	17,281	46,720	31,402	69,786	23,834	74,004	22,169	98,652	35,633	156,454	200,680	**357,134**	350,466	+ 2
1956	**448,233**	**599,688**	**884,842**	**770,158**	**3,596,200**	**5,101,337**	**2,430,849**	**1,823,227**	**2,682,229**	**4,801,463**	**690,092**	**8,186,911**	**13,817,980**	**22,004,891**	.....	**+11**
1955	447,656	570,196	852,905	863,067	3,338,475	4,781,246	2,425,773	1,625,157	1,807,611	4,055,295	647,895	6,521,445	13,268,674	.....	19,790,119	....
% Change	+0.1	+5	+4	−11	+8	+7	+0.2	−0.2	+48	+18	+7	+26	+4	+11	.....	....
SOUTH																
Va.	15,401	60,630	33,291	101,817	221,805	377,407	134,321	364,000	227,016	196,376	89,308	512,700	944,672	**1,457,372**	1,505,904	− 3
W. Va.	3,550	44,024	11,780	29,791	37,264	91,082	35,545	59,750	186,797	19,603	22,585	229,160	252,961	**482,121**	596,106	−19
N. C.	19,463	30,257	12,178	204,246	59,292	214,521	72,894	348,348	214,683	121,069	106,471	442,501	612,573	**1,055,074**	988,322	+ 7
S. C.	26,315	16,042	8,898	149,496	15,872	105,622	130,467	266,919	244,383	98,043	50,002	392,428	450,712	**843,140**	776,789	+ 9
Ga.	23,904	29,076	23,606	114,219	52,866	296,432	66,484	264,079	142,701	110,968	103,026	357,445	605,837	**963,282**	805,347	+20
Fla.	11,532	71,285	80,056	34,368	329,791	194,552	152,167	175,494	364,294	337,811	85,246	787,901	873,201	**1,661,102**	1,350,518	+23
Ala.	39,097	43,047	12,614	110,074	38,556	280,990	102,786	278,331	538,851	89,047	218,131	846,029	627,164	**1,473,193**	1,296,165	+14
Miss.	10,987	8,538	40,044	23,760	7,042	85,425	65,177	93,229	89,962	36,463	269,732	398,097	239,033	**637,130**	578,586	+10
La.	18,941	24,867	54,677	84,328	71,351	133,160	118,342	185,293	525,271	111,880	486,089	1,123,919	504,987	**1,628,906**	1,424,339	+14
Ky.	9,540	48,622	30,959	36,220	18,182	164,607	20,216	110,040	349,184	99,092	165,406	613,682	328,346	**942,028**	850,880	+11
Tenn.	13,791	43,035	33,257	78,203	27,067	384,051	96,000	267,730	311,673	203,608	168,237	683,611	675,311	**1,358,922**	1,271,652	+ 7
1956	**192,621**	**419,423**	**341,360**	**966,522**	**879,088**	**2,325,849**	**994,399**	**2,413,213**	**3,194,815**	**1,423,960**	**1,784,233**	**6,387,473**	**6,114,797**	**12,502,270**	.....	**+9**
1955	182,362	396,348	321,630	998,332	960,075	2,138,275	834,942	2,045,818	2,711,131	1,193,756	1,707,757	5,617,109	5,827,499	.....	11,444,608	....
% Change	+6	+6	+6	−3	−8	+9	+19	+18	+18	+ 19	+3	+14	+5	+9	.....	.....
MIDDLE WEST																
Ohio	149,876	314,790	141,087	99,816	1,073,207	1,045,383	205,701	209,168	1,322,533	1,150,415	469,262	2,956,057	3,016,013	**5,972,070**	5,215,759	+15
Ind.	19,667	68,646	87,199	83,692	456,059	349,856	57,981	99,179	809,052	287,912	137,498	1,234,902	1,122,660	**2,357,562**	2,377,578	− 1
Ill.	116,257	165,075	218,022	242,779	1,460,985	667,031	256,915	251,547	859,677	1,005,258	254,595	2,136,242	3,110,352	**5,246,594**	4,122,150	+27
Wis.	69,698	32,652	71,466	47,161	123,277	245,167	50,438	111,027	181,654	205,318	55,763	442,835	639,759	**1,082,594**	977,205	+11
Mich.	129,219	279,349	215,497	90,892	805,852	1,077,164	167,996	248,497	483,501	642,241	215,368	1,341,110	2,765,969	**4,107,079**	3,854,793	+ 7
1956	**484,717**	**860,512**	**733,271**	**564,340**	**3,919,380**	**3,384,601**	**739,031**	**919,418**	**3,656,417**	**3,291,144**	**1,132,486**	**8,111,146**	**10,654,753**	**18,765,899**	.....	**+13**
1955	402,216	789,029	591,226	545,432	3,233,641	2,839,927	697,475	805,932	3,656,112	2,726,115	1,066,312	7,473,607	9,073,878	.....	16,547,485	....
% Change	+21	+9	+24	+3	+21	+19	+6	+14	+0.01	+21	+6	+9	+17	+13	.....	....
WEST OF MISSISSIPPI																
Minn.	21,874	41,178	28,429	9,204	14,250	186,595	78,451	21,716	157,668	179,654	118,921	458,090	378,143	**836,233**	762,510	+10
Iowa	7,040	21,193	12,967	62,720	187,548	117,052	10,240	79,548	302,282	86,913	174,715	565,090	417,580	**982,670**	886,487	+11
Mo.	38,299	82,659	50,830	193,107	338,779	522,989	67,918	339,645	243,894	360,602	239,024	847,777	1,287,324	**2,135,101**	2,785,676	−23
Ark.	19,403	29,032	25,249	278,257	45,696	120,579	52,870	300,797	410,350	73,421	205,330	689,316	570,971	**1,260,187**	1,284,446	− 2
N. D.	5,794	2,418	333	154,406	375	21,185	52,986	199,016	12,512	22,747	50,602	85,861	237,497	**323,358**	285,644	+13
S. D.	8,065	2,293	980	115,641	4,907	17,631	9,115	113,984	5,790	9,250	45,112	60,152	158,632	**218,784**	214,305	+ 2
Neb.	24,770	34,464	22,248	141,197	16,940	197,403	57,568	180,211	92,215	89,619	91,122	274,409	493,137	**767,546**	662,532	+16
Kan	19,109	67,750	10,298	209,994	70,362	181,973	48,631	296,695	101,597	94,247	234,427	430,271	608,117	**1,038,388**	1,010,676	+ 3
Okla.	52,977	37,606	15,654	272,072	176,418	262,475	123,652	439,799	113,866	112,788	206,920	434,063	940,365	**1,374,428**	1,138,000	+21
Tex.	449,263	259,573	132,138	1,086,208	211,410	1,345,556	920,522	1,303,500	2,692,974	2,215,090	1,610,327	6,533,179	4,389,882	**10,923,061**	10,113,036	+ 8
Mont.	8,534	3,078	67,479	319,295	15,421	55,251	17,092	324,655	38,426	19,536	25,825	83,787	486,150	**569,937**	541,833	+ 5
Wyo.	5,910	5,239	2,072	195,576	16,568	29,288	11,244	210,210	40,262	14,548	80,846	135,656	265,897	**401,553**	367,894	+ 9
Colo.	94,913	18,341	13,511	327,990	124,129	232,424	139,543	498,918	77,486	244,831	215,742	538,059	949,951	**1,488,010**	1,417,061	+ 5
N. M.	5,003	4,607	1,497	41,043	3,107	85,893	68,206	134,006	111,380	31,506	184,872	327,808	209,306	**537,114**	503,719	+ 7
1956	**780,954**	**609,431**	**383,685**	**3,405,810**	**1,222,919**	**3,376,294**	**1,858,038**	**4,442,700**	**4,400,702**	**3,584,752**	**3,483,786**	**11,483,518**	**11,392,852**	**22,856,370**	.....	**+ 4**
1955	652,130	587,693	373,120	3,357,418	1,031,584	2,936,780	1,582,153	4,294,065	4,583,617	3,512,853	3,356,471	11,475,572	10,498,247	.....	21,973,819	....
% Change	+17	+4	+3	+1	+19	+15	+5	+3	−4	+1	+4	−0.1	+9	+4	.....	....
FAR WEST																
Idaho	3,644	10,225	7,341	112,452	25,571	81,151	31,506	172,519	26,910	17,236	550,977	595,123	271,910	**867,033**	831,520	+4
Utah	15,768	34,487	4,678	118,973	20,853	118,443	36,662	144,514	53,817	73,013	134,141	290,971	349,864	**640,835**	507,711	+20
Ariz.	4,842	16,914	2,433	591,815	43,058	52,271	92,452	668,628	140,102	102,172	157,390	399,664	803,785	**1,203,449**	1,073,165	+12
Nev.	8,918	2,287	4,374	36,084	.....	35,509	17,381	26,894	18,602	79,380	44,790	142,772	104,553	**247,325**	222,654	+11
Wash.	105,342	68,205	201,757	1,707,335	649,408	773,053	278,356	1,326,758	385,927	393,586	203,433	984,053	3,782,349	**4,766,402**	4,250,176	+12
Ore.	5,280	21,885	29,448	239,112	26,471	92,379	31,894	281,063	230,493	79,983	222,951	533,427	445,469	**979,896**	830,295	+18
Calif.	142,586	389,489	148,595	2,666,872	659,307	2,094,710	2,469,058	1,013,151	895,241	3,407,365	590,556	4,894,035	8,569,744	**13,463,779**	10,528,41	+28
1956	**286,400**	**543,492**	**398,626**	**5,472,643**	**1,424,688**	**3,247,516**	**2,957,309**	**3,633,527**	**1,751,092**	**4,152,735**	**1,904,238**	**7,810,045**	**14,328,674**	**22,138,719**	.....	**+21**
1955	254,867	506,455	401,702	5,321,861	1,135,715	2,522,131	1,297,001	3,413,796	1,183,716	3,581,463	2,039,025	6,805,717	11,438,219	.....	18,243,936	....
% Change	+12	+7	−1	+3	+25	+29	+128	+6	+48	+16	−7	+15	+25	+21	.....	....
CANADA																
1956	**197,754**	**293,831**	**235,270**	**807,829**	**1,302,145**	**1,885,186**	**1,421,422**	**883,496**	**2,628,440**	**2,072,927**	**1,717,521**	**6,420,462**	**5,921,843**	**12,342,305**	.....	+ 2
1955	192,935	249,744	188,491	829,902	1,384,020	1,692,757	1,338,033	858,562	2,172,632	2,319,886	1,682,850	6,176,942	5,873,408	.....	12,050,350	....
% Change	+2	+18	+25	−3	−6	−2	+6	+1	+21	−11	+2	+4	+1	+2	.....	....

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HIGHWAYS
CHEMICAL PLANTS
PIERS
BULKHEADS
COMMERCIAL BUILDINGS
HOSPITALS
SCHOOLS
UTILITIES
AIRFIELDS AND AIR BASE FACILITIES
PIPELINES
DRY DOCKS
SHIPWAYS
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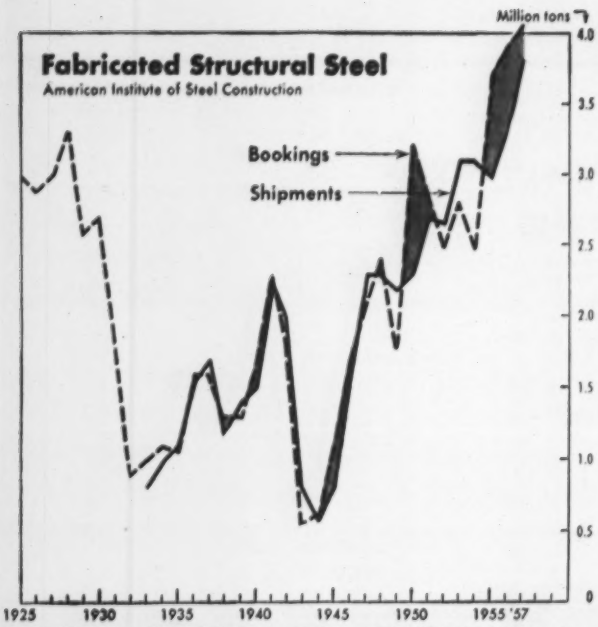
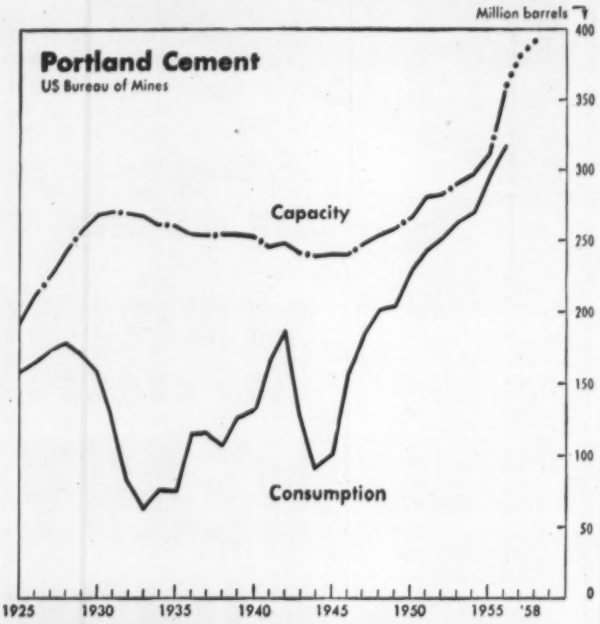


FABRICATED STRUCTURAL STEEL BOOKINGS still outpace shipments. Balance is not expected until 1959.



CEMENT SHORTAGES ARE LESS LIKELY because the gap between capacity and consumption is widening.

Materials Delivery Schedules in 22 Cities—

Key: N=Normal SL=Slower than Normal I=Immediate Delivery time shown in days

Material	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia
Cement, Portland	3	2-3	1	1-6	I	1-2	1-2	1-7	N	SL	7	N	N	N	N	N-I
Structural shapes	a	30-90	90	30	360	30-60	90	14	90	Indef.	Indef.	SL	SL	....	Indef.	30-90
Reinforcing bars	a	7-14	90	20-30	14-21	21-28	7	7	90	30+	2	SL	N	SL	N	30-90
Sheetpiling steel	I	.....	.....	.....	180	Indef.	.....	7	I	420	.....	b	Indef.	....	.....	30-90
Copper water tubing	1	1	1	1-2	I-30	I	1-2	30	I	N	I	N	N	N	I	N
Centrifugal cast iron pipe	21-28	10-20	.....	14	28-42	.....	.....	30	.....	.....	70	N	N	N	.....	N
Stainless steel, flat	To 42	3-5	180-240	30-40	7-14	30-40	7-10	10±	60-90	N	30	N	SL	N	84	42
Aluminum sheets, flat	To 42	3-5	5	7-14	7-14	60-90	5-7	10±	60-90	N	30	N	N	N	2-3	N
Douglas fir	.....	2-10	7-14	2-28	To 7	3-5	4-16	.....	30	N	30	N	N	N	N	I
Southern pine	To 10	2-7	7-10	7-21	To 7	8-10	4-6	7-14	.....	N	30	....	N	N	N	I
Plywood, Douglas fir	To 21	3-4	7-21	2-4	To 7	30-45	21	30	.....	N	30	N	N	N	45	I
Vitrified clay sewer pipe	120	3-4	7-120	1-7	10	3-4	7	7	I	N	1	N	N	N	N	N
Concrete sewer pipe	3	3-4	90	1-7c	I	2-3	2-3	7	I	N	2	N	N	N	1	N
Structural clay tile	2-3	5-7	14-21	2	I	5-7	2-3	10±	.....	N	2	....	N	N	5-7	N
Brick	2-3	1-2	10-14	2	I	5-7	2-3	10±	N	N	2	N	N	N	N	N
Mineral wool insulation	2-7	3	35-42	2-7	To 14	20-30	2-3	14+	30	N	14-28	N	N	N	N	I
Glass fiber insulation	2-3	3	21-28	1	To 14	20-30	10-14	14+	I	N	14-28	N	N	....	N	I
Gypsum lath	2-3	3-7	1	2-3	To 10	5-10	3-5	14+	30	N	14-28	N	N	N	I	SL
Gypsum sheathing	2-3	3-7	1	2-3	To 10	40-60	3-5	14+	30	N	14-28	N	N	N	I	SL
Window glass	I	2-4	1-3	2-7	1-14	2-5	1-35	7-14	20	N	1	N	N	N	N	I

a Delivery on application. b Order books closed for 1957. c Deliveries depend on mill rules and size of pipe.

Materials Supply Situation Improving

Expanded materials production capacity and scattered indications of lessening demand are improving the materials supply outlook for construction contractors. The outstanding exception is steel, particularly fabricated structural steel (see chart on opposite page). But even here, suppliers are stepping up delivery rates. Some fabricating shops are making normal deliveries for current needs to regular customers right along. The fabricating industry as a whole expects to expand deliveries during the first four months of 1957 by 16%, which should help fill the gap. However, not until 1959 is an actual balance of demand and supply expected by steel industry spokesmen.

Meanwhile road contractors grumble about delays in completing schedules on roads now under construction and wonder how they will manage when the big $100-billion road program really gets under way later this year.

• **Last year cement** was a problem in a number of key areas, but with capacity estimated at 357 million bbls at the close of 1956 and at 381 million bbls by the end of 1957 against shipments of around 310 million bbls last year, cement shortages may well be a thing of the past.

The decline in home building in 1956 and the prospects that 1957 may see a further sag is easing demand for lumber, plywood, brick, tile, asphalt roofing and siding, gypsum lath and sheathing, and window glass.

• **Plant expansion** by leading gypsum producers plus the entry of Allied Chemical and Dye, Johns-Manville, and Flintkote into the field brought gypsum products into good supply in 1956 just as demand from residential construction contractors began to taper off. As a result, shortages melted away.

• **Aluminum shortages** have also all but disappeared under the impact of sharply increased supplies and reduced government stockpiling. The industry is now looking for new markets for its tonnages. This year's aluminum supply has been estimated by the trade at over 2.5 million tons, or 200,000 tons more than in 1956. The construction industry absorbs about 20%—mainly wire and cable, non-heat treatable sheet and plate, and soft alloy extruded shapes.

January, '57

	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
	N-I	1-2	N-I	2	14	2
	3	60-90	45	120	105	180-270
	3	5-60	21	120	105	14
	....	.....	30-45	.....	50	Indef.
	1	2-10	1	30	7	1-14
	....	c	14	10	7	1-3
	1	3-10	30-45	10	30	84-98
	1	2-3	21-30	42	30	70
	1	1-3	7-14	7-21	7-40	1-2
	1	1-3	.....	.....	7-40	1-2
	1	1-2	14-21	1	30	1-2
	1	1-3	7	1-45	14	1-4
	1	1-3	7	1	2	1-2
	1	3-7	3	1	7	1-2
	1	1-2	3	1	20	7-30
	1	1-3	7-14	2	7	1
	1	2+	7-14	2	7	1
	1	1-3	7	2	7	1
	1	1-3	7	2	7	1
	1	2-10	30	15-30	7	1-21

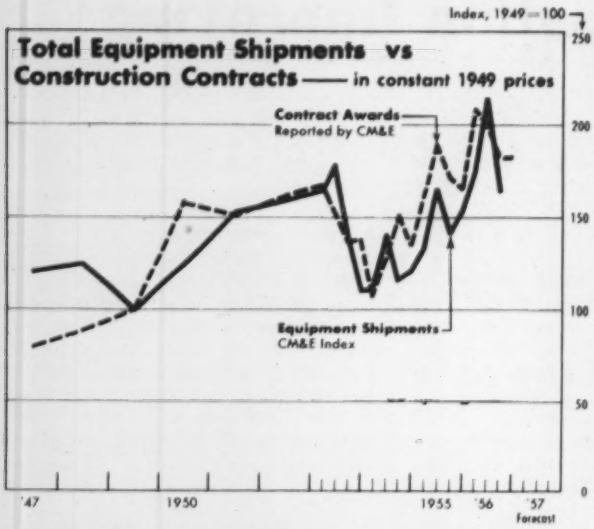
Materials Shortage Check — January, 1957

Material	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
Cement, Portland										✓												✓
Structural shapes	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓
Reinforcing bars	✓		✓			✓			✓	✓				✓		✓					✓	
Sheetpiling steel					✓	✓				✓		✓	✓			✓			✓		✓	✓
Copper water tubing																						
Centrifugal cast iron pipe					✓																	
Stainless steel, flat			✓	✓		✓			✓				✓		✓	✓					✓	
Aluminum sheets, flat						✓			✓												✓	
Douglas fir																						
Southern pine																						
Plywood, Douglas fir																						✓
Vitrified clay sewer pipe	✓		✓								✓											
Concrete sewer pipe																						
Structural clay tile																						
Brick																						
Mineral wool insulation																						
Glass fiber insulation																						
Gypsum lath		✓																				
Gypsum sheathing		✓																				
Window glass						✓	✓		✓													

Construction Materials Shipments

Material	Source	Unit	1954	1955	1956	Percent change '55-'56
Steel						
Fabricated structural bookings	AISC	thous tons	2,509.8	3,095.5	4,013.2	+ 9
Fabricated structural shipments	AISC	thous tons	3,135.5	2,982.3	3,205.5	+ 7
Reinforcing bars (net)	AISC	thous tons	1,751.0	2,164.6	2,469.0*	+14
Cement, Portland						
Shipments	Bu Mines	mil bbls	276.1	292.7	310.0*	+ 6
Concrete pavement awards	PCA	mil sy	85.3	92.8	81.9	− 9
Lumber						
Orders	NLMA	mil fbm	37,354.0	39,744.0	36,126.0	− 9
Production	NLMA	mil fbm	37,329.0	39,105.0	37,503.0	− 4
Shipments	NLMA	mil fbm	37,038.0	39,005.0	36,455.0	− 8
Plywood, Douglas fir						
Orders (3/8 in. basis)	DFPA	mil sq ft	4,108.0	4,817.0	4,996.0	+ 4
Production (3/8 in. basis)	DFPA	mil sq ft	3,903.8	4,980.2	5,172.8	+ 6
Clay construction products						
Brick, unglazed, common and face	Bureau	mil std bricks	6,119.4	7,012.2	6,870.0*	− 2
Structural tile, unglazed	of	thous short tons	895.3	854.3	675.0*	−19
Vitrified clay sewer pipe	Census	thous short tons	1,636.5	1,874.4	1,855.0*	− 1
Aluminum wrought products (net)						
Sheet and plate, non heat-treatable	Bureau	mil lbs	708.2	1,049.7	1,095.0*	+ 4
Wire and cable	of	mil lbs	217.6	258.1	300.0*	+16
Extruded shapes, soft alloy	Census	mil lbs	385.8	634.9	650.0*	+ 2
Asphalt products						
Roofing	Bu of	thous sales sqs	50,132.3	62,582.4	60,080.0*	− 4
Siding	Census	thous sales sqs	1,427.8	1,288.4	1,230.0*	− 5

* Estimated



TWO ADVANCE INDICATORS of Future Construction Equipment shipments are shown above. On the left, ENR's Heavy Construction Volume Index moves closely with total construction equipment shipments measured by the Construction Methods & Equipment (McGraw-Hill) Index.

These indexes measure contract awards and shipments in constant 1949 prices. On the right, domestic shipments of equipment in current prices, as measured by CM&E index, follow closely the New Orders Index computed by the McGraw-Hill Department of Economics.

Equipment Shipments to Set Record

Record demand for new excavating and earthmoving equipment caused manufacturers' shipments to soar 30% in 1956. This year, a further 10% rise and a new record in dollar value is predicted for domestic shipments of equipment.

CONSTRUCTION METHODS & EQUIPMENT (McGraw-Hill) reports that its Domestics Shipments Index should hit a record high of 260 for 1956, based on 1949—100, when last year's final figures are in. This year, it should rise to a new record of 285. This forecast is based on:

- An increasing volume of heavy construction contract awards, forecast by ENR to rise 7% this year.
- A record volume of new orders forecast by a sample of equipment makers, which indicates an 8% rise in volume of new orders during the first nine months of '57 compared to the same period of '56.
- A continuing rise in equipment prices averaging about 4% over 1956.

A check of 11 major equipment manufacturers shows that this 10% rise agrees with the expectations of most. However, a couple of firms think their sales will rise more than 10%. Manitowoc expects to a little better than 10%, while Frank G. Hough has scheduled production of "Payloaders" more than 20% higher than the 1956 rate.

- **Financing problem**—The "tight" money market poses a threat to this forecast of a further rise in equipment sales this year, particularly to the medium size and smaller contractors who rely most heavily on bank credit to finance their operations. Some contractors have found it increasingly difficult to borrow from their banks all of the working capital they need and this compels them to conserve what they have.

Prospects are dim for easier bank financing during the next couple of months. In fact, Federal Reserve spokesmen indicate that if anything, the credit screws should be tightened. To contractors, this means that they will be wise to arrange bank credit in advance of tying themselves down to new construction contracts. Otherwise, they face the chance of not being able to finance new equipment needed on the job.

- **Good deliveries**—Two out of three manufacturers checked say they can handle a 10% increase in orders this year without stretching out delivery time (from order to date of shipment from plant).

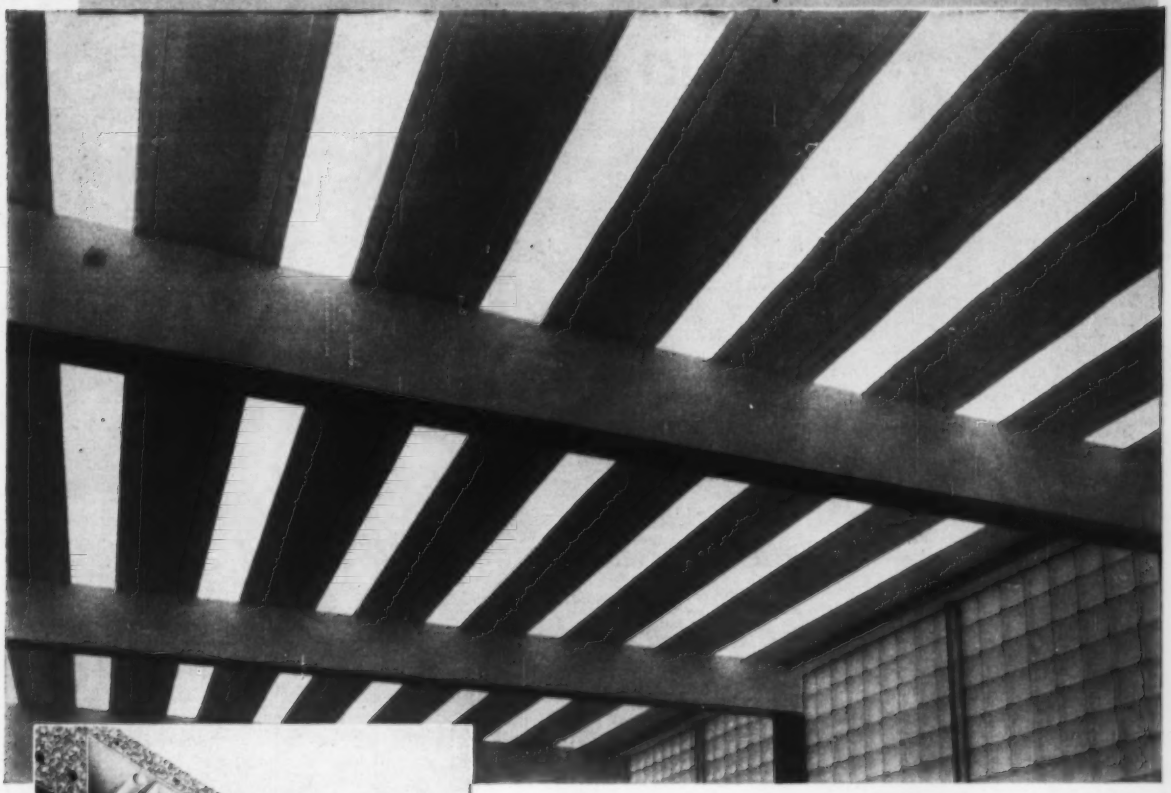
Plant expansion recently completed or to come on the line in '57 will help manufacturers handle increased sales without lengthening delivery time. For some firms, added capacity will mean better deliveries.

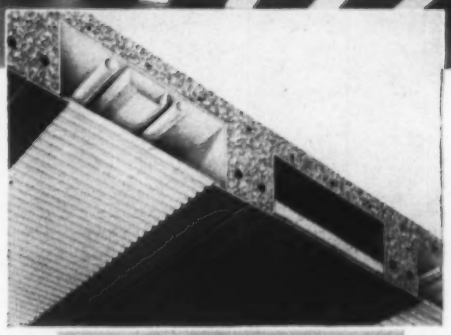
Of course, if orders should come in a sudden burst, delivery waits could lengthen. Even now, there are some firms which see stretch-outs ahead if orders for certain models increase by 10%. Marion, for example, would expect longer delivery times for intermediate shovel sizes, and Dart Truck sees the possibility of extending waits if sales rise 10% or more.

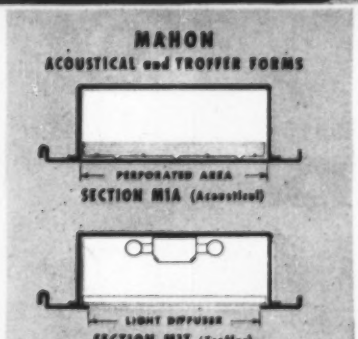
As they run right now, delivery times are longest for power shovels and off-highway trucks. Minimum and maximum waits for delivery (order date to factory shipment) as reported by a sample of manufacturers are:

- Power shovels: Under 2 yard, the minimum time ranges from 1-3 weeks and maximum, 2-8 weeks; over 2 yard, the minimum is 2-8 weeks and maximum, 5-12 weeks.
- Crawler tractors: Minimum is 3-5 weeks and maximum is 4-8 weeks.
- Wheel tractors: Maximum is 2 weeks to 30 days.
- Scrapers: 3-week minimum for one make; 30-day maximum for another make.
- Off-highway trucks: Minimum is from stock to 8 weeks; maximum is 6-20 weeks.
- Crawler cranes; Minimum is from stock (smaller models) to 40 days and maximum is 5-8 weeks.
- Truck cranes: Minimum is 2-10 weeks and maximum is 3-20 weeks.

ACOUSTICAL and TROFFER FORMS







Above is the Ceiling of the Auditorium in the Bagaduce Montessori School, Detroit, Michigan. It is one of 50 rooms with Mahon Acoustical-Troffer Ceilings. Shreve, Walker & Associates, Inc., Architects. Alfred A. Smith, Inc., Gen. Contractors.

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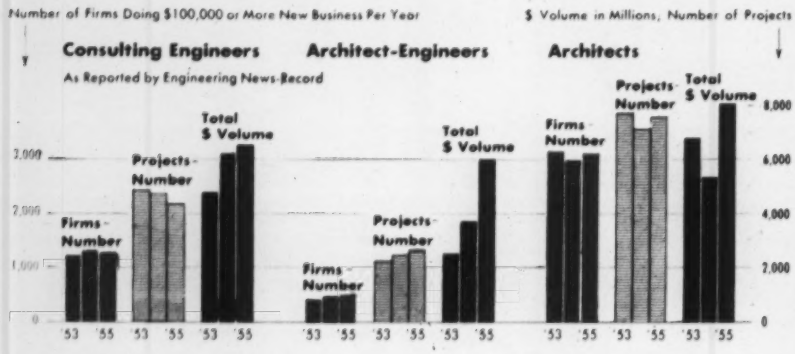
Number of Firms Doing $100,000 or More New Business Per Year
$ Volume in Millions, Number of Projects
Consulting Engineers
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Architects
As Reported by Engineering News-Record
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Projects Number
Total $ Volume
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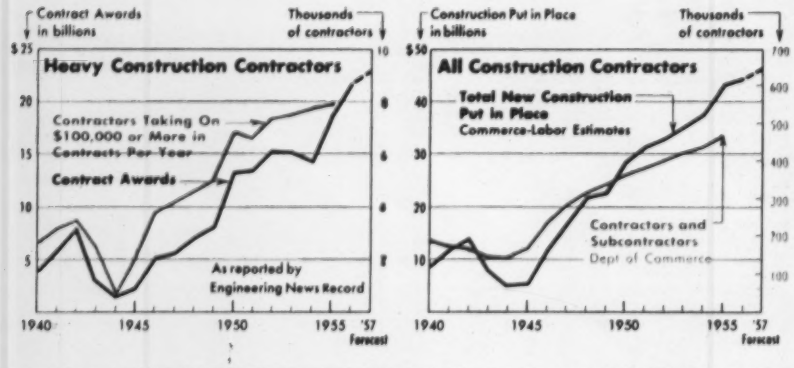
Contract Awards in billions
Thousands of contractors
Heavy Construction Contractors
Contractors Taking On $100,000 or More in Contracts Per Year
Contract Awards
As reported by Engineering News Record
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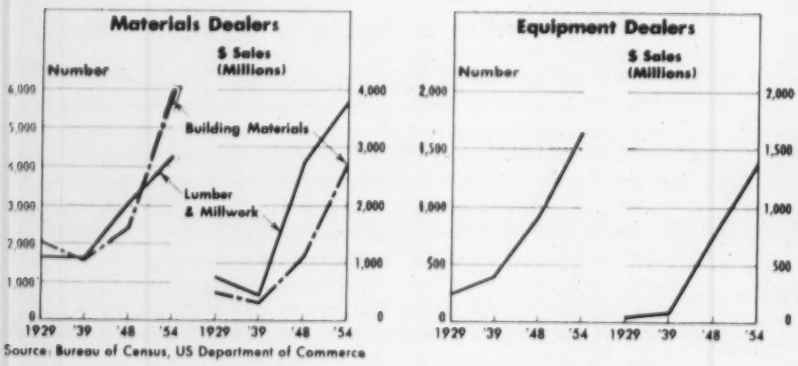
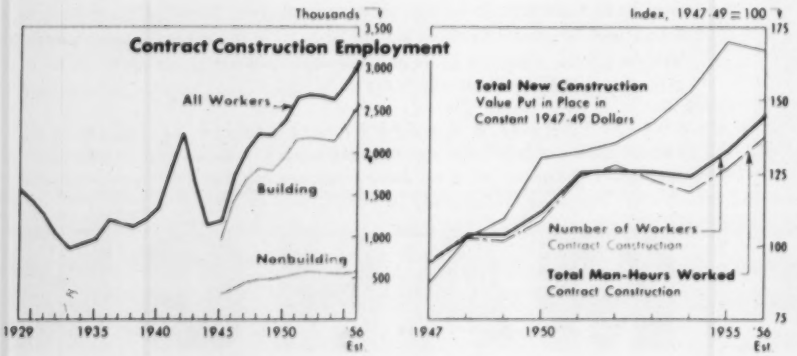
Construction Put in Place in billions
All Construction Contractors
Total New Construction Put in Place
Commerce-Labor Estimates
Contractors and Subcontractors
Dept of Commerce



Source: Bureau of Census, US Department of Commerce



A Fast Growing Organization of . . .

◀ **Planners**—The flood of new heavy construction projects onto planning boards of consulting engineers, architect-engineers and architects continued at a record rate in 1956. The number of firms that absorbed this increased load will not be known for several months. But in the previous years of this rise in planning new construction the number of firms has remained relatively constant while their volume of business has mushroomed. The chart shows how average volume per firm has increased; also how average project size has increased.

◀ **Contractors**—Heavy construction contractors, too, are averaging more work per firm as dollar volume of contracts increases faster than the increase in number of contractors. The 1956 count will not be available until mid-year but the trend is to larger average projects and more projects per company.

Contractors and subcontractors of all sizes reached a record number of 475,000 as of December '55, according to Dept. of Commerce figures. This represented a net addition of 100,000 during the five years 1950-55.

◀ **Suppliers**—The fastest growth in recent years among these three big groups of construction industry suppliers is the 144% jump in construction materials distributors from 1948 to 1954 (latest Census data.) In 1954, these numbered 6,010 with sales of $2,780 million.

The lumber and millwork dealers in the same period increased 38% to 4,304 firms with total sales of $3,806 million.

Construction and mining equipment distributors increased 81% in number over this period to 1,640 firms, while sales rose 80% to $1,401 million.

◀ **Labor**—Workers on contract construction hit a record monthly high of 3,353,000 in August 1956, according to the US Bureau of Labor Statistics. The year averaged slightly over 3 million per month, almost 260,000 more than 1955 and about 450,000 above the 1954 average. Nearly all of the sharp employment rise during the past two years is in the building trades. Greater mechanization has required little increase in the number of workers needed to handle the big increase in construction other than building.

NEW MACK

heavy-duty four- and six-wheel dumpers

15- to 34-ton capacity

* LARGEST SELECTION OF HEAVY DUMPERS

Mack offers you the most complete line of dumpers for mining, quarrying, road building, construction. From heavy-duty 170 horsepower, four-wheel dumpers with 15-ton capacities to super-duty 400-horsepower, six-wheel dumpers with 34-ton capacities, Mack provides the economy and performance that can mean bigger hauling profits for you.

* CHOICE OF ENGINES

Mack offers you a choice of engines . . . Cummins diesels in the 300- and 400-horsepower class . . . or Mack Thermodyne and Cummins diesels in the 170 to 205 horsepower class. No need to alter existing maintenance facilities to handle new engine makes . . . you get the truck you want with the engine you want.

* OUTSTANDING PERFORMANCE

When you buy Macks, you know that you are getting top performance, outstanding economy, maximum dependability—qualities that have made Mack the acknowledged heavy-duty truck leader in the industry. Moreover, Mack dumpers are planned for accessibility throughout . . . engines are easily reached, no place in the suspension ever needs adjustment—these and many more Mack features reduce maintenance costs and make routine servicing easier. And in Macks, you get the finest transmissions and axles available . . . made by Mack and found only in Macks!

* COMPETITIVELY PRICED

Mack off-highway dumpers are priced right in line with competitive makes. Yet, with Macks, you get those "extras" that mean more payloads at lower hauling costs . . . cabs engineered for maximum driver efficiency . . . specially designed components with extensive use of heat-treated alloy steels . . . single-unit all-welded frames that can take plenty of hard knocks . . . outstanding performance and economy from a complete line of engines.

* STOCK DELIVERY

All 15 and 22½-ton Mack dumpers are available from stock. The units you want with the engines and transmissions you want can be supplied upon gratifyingly short notice. There are no delays, no production schedules for you to worry about. For more information on delivery, contact your local Mack Dealer or Representative.

MACK LRX

capacity: 15 tons

This four-wheel, off-highway dumper combines a big 15-ton rated capacity with outstanding maneuverability. Either a Mack or Cummins diesel engine of the 200-horsepower class—along with heavy-duty clutch, 10-speed transmission, and Mack's Planidrive rear axle assembly—gives plenty of pulling power for long hauls on steep grades. Rugged, unified frame assembly, powerful air brakes, and comfortable cab with driver's position offset to the left assure the top performance and efficiency that have made the LRX a highly popular dumper in mine, quarry, and road-building operations.

CONDENSED SPECIFICATIONS

STANDARD EQUIPMENT

DIMENSIONS:	14.00-24 Rear Tire
Wheel Base	12′ 6″
Platform	9′ 1″
Overall Width	10′ 9½″
Overall Height	10′ 5″
Overall Height (Body Raised)	18′ 8″
Overall Length	24′ 7½″
Turning Circle Diam. (To outside edge of tire)	60′
Weight (Chassis, Body & Hoist)	33,000 lbs.
Payload	30,000 lbs.

ENGINE (Diesel):

Model	END 673
Make	Mack, Thermodyne
Type	Naturally aspirated
Number of cylinders	Six
Bore and stroke	4⅛″ x 6″
Piston displacement, cu. in.	672
Brake horsepower (@ 2100 r.p.m. (gov.)	170
Max. torque (@ 1200 r.p.m.	480 lb.-ft.

CLUTCH (Available with END 673 only):

Type	Mack single-plate, dry
Area of engagement, sq. in.	253

ELECTRICAL SYSTEM:
Voltage and capacity 12 V., 50 Amp. (24 V., Starting)

TRANSMISSION:

Type	Mack selective, constant mesh
No. of speeds, forward	Nine
reverse	Two

FRONT AXLE:
Make Mack Reversed-Elliott, dropped forged I-beam

REAR AXLE:

Make	Mack Planidrive
Drive	Dual Reduction
Final Drive (3rd reduction)	Planetary gear train within wheel hubs
Total Ratio	16.5

BRAKES (Air):

Compressor	Tu-Flo
Type	Internal expanding
Front, size	17¼″ x 5″ x ¼″
Rear, size	20″ x 7″ x ¼″
Hand, size	12″ x 5″ x ⅛″, Bendix

FRAME:

Side-members, size	12½″ x 6¼″ x ½″, wide flange I-beam, rolled section
Section modulus	60.7 (per rail)

SPRINGS:

Front, type	Semi-elliptic
Rear, suspension	Semi-rigid, axle saddle mounted to frame

WHEELS:
Type Cast, spoke

STEERING GEAR:
Control Manual

TIRES:	Front	Rear
Size	12.00-24 (16P) Rib	14.00-24 (20P) Lug

CAB:
Type: Heavy-duty off-highway, closed, all-steel welded. Offset 10¼″ to left of chassis centerline provides clear vision for driver to rear.

CHASSIS EQUIPMENT: Front and rear tow pins; air horn on cab roof; cab entrance steps and platforms; rear view mirror, left side; channel type front bumper; dual windshield wipers; stop-tail light; rim lug wrench and handle.

HOIST:
Make & model Heil
Type Twin, double-acting, 8″ diameter, hydraulic cylinders with 24″ stroke, 70° dumping angle.

BODY:

Type	Rock, with scoop end
Make	Heil
Capacity, line of plate	9.8 cu. yds. struck

Construction: ¼″ steel plate shell bottom; ⅜″ sides and header; ½″ wear and side bevel plates; ¼″ canopy. 3″ x 5 lb. channels between floor plates either side of a 1⅛″ edge-grain hardwood middle section filler.

OPTIONAL EQUIPMENT

ENGINE (Diesel):

Model	NHB	ENDT 673
Make	Cummins	Mack, Thermodyne
Type	Naturally aspirated	Turbocharged
Number of cylinders	Six	Six
Bore and stroke	5½″ x 6″	4⅛″ x 6″
Piston displacement cu. in.	743	672
Brake horsepower (@ 2100 r.p.m. (gov.)	200	205
Max. torque (@ r.p.m.	1200	1400-1600
pound-feet	537	560

CLUTCH (Included with NHB and ENDT 673):

Type	Mack two-plate, dry
Area of engagement, sq. in.	416

TIRES:	Front	Rear
Size	13.00-24 (18P) Rib	16.00-25 (20P) Lug

BODY:

Type	Flared Quarry
Make	Heil
Capacity, line of plate	11 cu. yds. struck

Construction: ¼″ steel plate shell bottom; ½″ sides; ⅜″ header; ½″ wear and side bevel plates; ¼″ canopy. 3″ x 5 lb. channels between floor plates either side of a 1⅛″ edge-grain hardwood middle section filler.

Exhaust Heating: Provisions for exhaust heating of dump body available.

Body Equipment: (for std. and opt. bodies): (9) ¼″ x 6″ alloy wear bars; rock ejectors; ½″ alloy wear plate; welded-on side boards (for std. body only).

CHASSIS EQUIPMENT: Automatic radiator shutters; Wagner "BB" (24 hour chart 0-3500 r.p.m.) tachograph, in place of standard tachometer; speedometer; hubodometer, left front wheel; Vickers power steering; front wheel limiting valve; hand control valve to operate rear service brakes; low air pressure indicator, Wig-Wag type; radiator guard; 25,000 B.T.U. hot water cab heater with defrosters; spare rim; hydraulic jack, 20-ton; air starting.

MACK LRSW

capacity: 30 tons

Powered by a 300-horsepower engine, this 30-ton, six-wheel dumper has what it takes for off-highway operation in mines, quarries and earth-moving projects. Smooth application of power to its balanced, four-wheel drive bogie is obtained by an air-assisted clutch and overgear transmission with two-speed compound or torque converter. Convenient location of controls, angle steering column, hydraulic steering booster, and extreme left driver position give easy and efficient handling. Best materials, precision manufacture, and specially engineered components make the LRSW capable of withstanding the toughest 'round-the-clock hauling.

CONDENSED SPECIFICATIONS

STANDARD EQUIPMENT

DIMENSIONS:

Wheelbase	16' 10"
Platform	14' 11½"
Overall Width	11' 1⅝"
Overall Height	11' 5⅛"
Overall Length	29' 4"
Overall Height (Body Raised)	24' 10"
Turning Circle Diam. (To outside edge of tire)	78'
Weight (chassis, body & hoist)	60,000 lbs.
Payload	60,000 lbs.

ENGINE (Diesel):

Model	NHRBIS
Make	Cummins
Type	Supercharged
Number of cylinders	6
Bore and stroke	5⅛" x 6"
Piston displacement, cu. in.	743
Brake horsepower @ 2100 r.p.m. (gov.)	300
Max. torque @ 1500 r.p.m.	818 lb.-ft.

CLUTCH:

Type	Mack two-plate, dry
Area of engagement, sq. in.	416
Actuation	Manual, with air assist

ELECTRICAL SYSTEM:

Voltage and capacity	12 V., 50 Amp. with 24 V., starting

TRANSMISSION:

Type	Mack two-lever, Duplex
No. of speeds, forward	Eight
reverse	Two

FRONT AXLE:

Type . . . Mack Reversed-Elliott, drop forged I-beam

BOGIE:

Make	Mack Planidrive
Final drive, type	Four-wheel, planetary
Inter-axle differential, type	Mack concentric cam and plunger Power Divider
Carriers	Mack Dual Reduction
Total Ratio	18.18

BRAKES:

Type and actuation	Internal expanding, inclosed, air
Front, size	17¼" x 5" x ¼"
Rear, size	20" x 7" x ¼"
Hand, size	16" x 3" x ¼", four-shoe, disc

FRAME:

Type	I-beam, wide flange
Material	Alloy steel
Side-members, size	13 15/16" x 8" with ⅜" web and top flange, ⅞" bottom flange
Section modulus	84.5 per rail

SPRINGS:

Type, front	Semi-elliptic
rear	Semi-elliptic, inverted
Suspension, Mack	Rubber Shock Insulators

SHOCK ABSORBERS, FRONT:

Type . . . Houdaille, hydraulic

TIRES (Lug):

	Front	Rear
Size	14.00-24 (20P)	16.00-25 (20P)

WHEELS . . . Cast, spoke

STEERING GEAR:

Power steering assist . . . Vickers hydraulic booster

CAB:

Type . . . Heavy-duty off-highway, closed, all-steel, welded. Offset 10¼" to left of chassis centerline provides clear vision for driver to rear.

CHASSIS EQUIPMENT: Hubodometer; screen type radiator guard; front and rear tow pins; air horn; rear view mirror, left side; exhaust through hood with in-line muffler; channel type front bumper; door in hood side for access to oil filler and dip stick; insulating dash mat; wig-wag low air pressure indicator; windshield wipers; stop and tail light; back up light; rim lug wrench and handle.

HOIST:

Make . . . Heil

Type—Twin, double-acting, 10" diameter, hydraulic cylinders with 40" stroke, 70° dumping angle with power return.

BODY:

Make and type	Heil, Rock-scoop end
Capacity, line of plate	21 cu. yds.

Construction: ¼" steel plate shell bottom; ½" sides and header; ½" wear and side bevel plates; ¼" canopy, 3" x 7.1 lb. channels between floor plates either side of a 2" edge-grain hardwood middle section filler.

OPTIONAL EQUIPMENT

ENGINE:

Make and model	Cummins, NRTO
Number of cylinders	Six
Bore and stroke	5½" x 6"
Piston Displacement cu. in.	743
Brake horsepower @ 2100 r.p.m. (gov.)	335
Max. torque @ 1500 r.p.m.	900 lb.-ft.
Turbocharger	Turbine, exhaust driven

TRANSMISSIONS:

Westinghouse Converter and Mack 4 Speed Transmission. Clutch—2-plate, 17"

Allison Torqmatic Converter and Allison Transmission

WHEELS, TIRES:

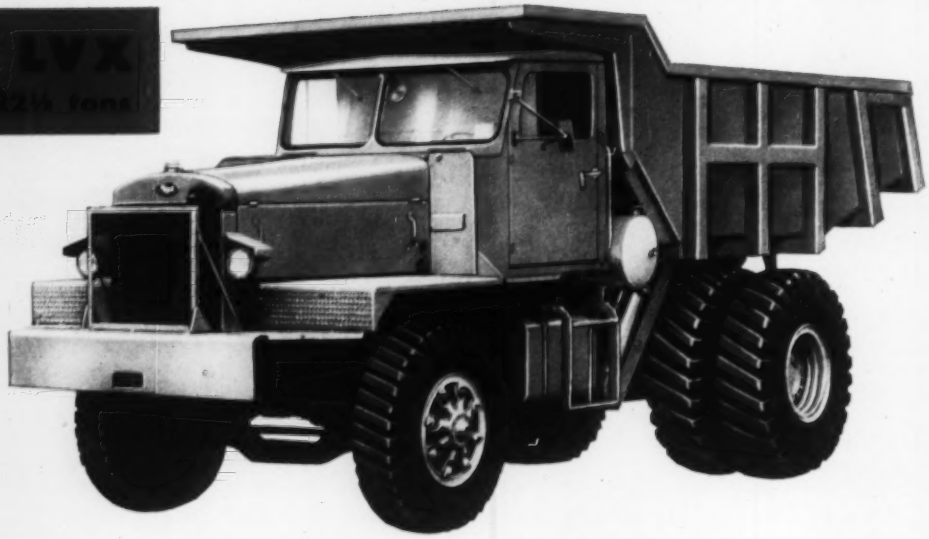
Front & rear Wheels, type	Cast spoke
Tires, size	16.00-25
Ply-rating, front	20 or 24
rear	24

BODY EXHAUST HEATING: Provisions to permit passage of exhaust gases through area between wear plate and shell bottom; controlled by baffles and exhausted through second rear vertical bolster on right side.

CHASSIS EQUIPMENT: Front wheel brake limiting valve; separator for air system; 25,000 B.T.U. heater with defrosters; windshield defroster fan; engine chrome cylinder liners and stellite inlet valve seats; tachograph, Wagner "BB", 24-hour chart 0-3500 r.p.m. (in place of standard tachometer); speedometer (single-hand); exhaust outlet under cab suitable for attachment to body for body heating; automatic (air) radiator shutters; 20-ton jack, hydraulic; spare rim.

MACK LVX

capacity: 22½ tons



This four-wheel dumper with its 22½-ton rated capacity provides maximum payloads at minimum unit cost. Equipped with a 300-horsepower engine, over-gear transmission with two-speed compound or torque converter, and Mack's exclusive Planidrive rear axle assembly, it is powered to give top performance under the most punishing operating conditions.

All-welded, single-unit, alloy-steel frame gives LVX's stamina and rugged durability. Elbow steering column, hydraulic steering booster, two-plate air-assisted clutch, and job-engineered cab with extreme left driver position assure maximum operating efficiency. From top to bottom, this big Mack gives you the "extras" that mean minimum hauling costs.

CONDENSED SPECIFICATIONS

STANDARD EQUIPMENT

DIMENSIONS:

Wheelbase	14' 2"
Platform	9' 11"
Overall Width	11' 2"
Overall Height	11' 6¼"
Overall Length	26' 8½"
Overall Height (Body Raised)	21'
Turning Circle Diam. (To outside edge of tire)	62'
Weight (chassis, body & hoist)	40,800 lbs.
Payload	45,000 lbs.

ENGINE (Diesel):

Model	NHRBIS
Make	Cummins
Type	Supercharged
Number of cylinders	Six
Bore and stroke	5⅛" x 6"
Piston displacement, cu. in.	743
Brake horsepower (@ 2100 r.p.m. (gov.)	300
Max. torque (@ 1500 r.p.m.	818 lb.-ft.

CLUTCH:

Type	Mack Two-plate, dry
Area of engagement, sq. in.	416
Actuation	Manual, with air assist

ELECTRICAL SYSTEM:
Voltage and capacity . 12 V., 50 Amp. (24 V. Starting)

TRANSMISSION:

Type	Mack selective, constant mesh
No. of speeds, forward	Eight
reverse	Two

FRONT AXLE:
Type . . . Mack Reversed-Elliott, drop forged I-beam

REAR AXLE:

Make	Mack Planidrive
Drive	Dual reduction, spiral bevel
Final drive (3rd reduction)	Planetary gear train within wheel hubs
Total Ratio	17.66

BRAKES (Air):

Compressor	Tu-Flo
Type	Internal expanding
Front, size	17¼" x 5" x ¾"
Rear, size	18" x 10" x ¾"
Hand, size	16" x 3" x ¼"

FRAME:

Type	I-beam, wide flange
Material	Alloy steel
Side-members, size	13$^{11}/_{16}$" x 8" x ⅝" (Fabricated)
Section modulus	74.8 per rail

SPRINGS:

Front	
Type	Semi-elliptic
Suspension	Mack rubber shock insulators
Rear	
Type	Progressive rate, semi-elliptic
Suspension	Cam face slipper ends with radius rods

TIRES:

	Front	Rear
Size	14.00-24 (16P) Rib	18.00-25 (24P) Lug

WHEELS:
Type . . . . . Cast, spoke

STEERING GEAR:
Power steering assist . . . Vickers hydraulic booster

CAB:
Type . Heavy-duty off-highway, closed, all-steel, welded. Cab offset 10¼" to left of chassis centerline provides clear vision for driver to rear.

CHASSIS EQUIPMENT: Screen type radiator guard; front and rear tow pins; air horn on cab roof; dual windshield wipers; two air reservoirs; rear view mirror, left side; exhaust through hood with inline muffler; channel type front bumper; stop-tail light; rim lug wrench and handle.

HOIST:
Type . . . Twin, double-acting, outboard mounted, three section telescopic cylinder assembly directly connected to body and chassis through a universal joint arrangement providing a 70° dumping angle.

BODY:

Type	Rock, with scoop end
Make	Heil
Capacity, line of plate	14.8 cu. yds. struck

Construction: ¼" steel plate shell bottom; ⅛" sides and header; ½" wear and side bevel plates; ¼" canopy. 3" x 7.1 lb. channels between floor plates either side of a 2" edge-grain hardwood middle section filler.

OPTIONAL EQUIPMENT

ENGINE:

Model	NRTO
Make & type	Cummins, turbocharged
Number of cylinders	Six
Bore and stroke	5⅛" x 6"
Piston displacement, cu. in.	743
Brake H.P. (@ 2100 r.p.m. (gov.)	335
Max. torque (@ 1500 r.p.m.	900 lb.-ft.

TRANSMISSIONS:
Westinghouse Converter and Mack 4-Speed Transmission. Clutch 2-plate, 17".
Allison Torqmatic Converter and Allison Transmission.

FRONT AXLE: Special Heavy-duty, Reversed-Elliott, Drop Forged I-beam.

TIRES:

	Front
Size	14.00-24 (20P) Rib

BODY:

Type	Flared Quarry
Make	Heil
Capacity, line of plate	15 cu. yds., struck

Construction: ¼" steel plate shell bottom; ½" sides; ⅛" header; ½" wear and side bevel plates; ¼" canopy. 3" x 7.1 lb. channels between floor plates either side of a 2" edge-grain hardwood middle section filler.

Exhaust Heating: Provision for exhaust heating of dump body available.

CHASSIS EQUIPMENT: Air starting, Ingersoll-Rand 9HP; Tachograph, Wagner "BB" (24 hour chart 0-3500 r.p.m.) in place of standard tachometer; Wig-Wag low air pressure indicator; hand control valve to operate rear service brakes; front wheel brake limiting valve; 25,000 B.T.U. hot water cab heater with defrosters; windshield fan mounted on windshield header; hub-odometer; air operated radiator shutter; Schwitzer air operated Thermo-controlled radiator fan hub; speedometer; back-up light; hydraulic jack, 20-ton; spare rims.

only MACK gives you features like these...

MACK-BUILT FRONT AXLES

Mack's reversed Elliott, forged I-beam front axles are made extra strong for long, trouble-free service. Extensive use of heat-treated steels for crucial parts assures minimum maintenance. Straight tie rod and rugged construction of self-adjusted brake shoes insure top performance.

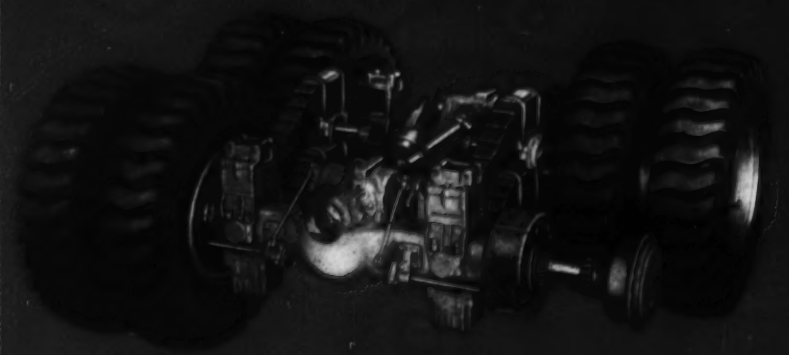
MACK-BUILT 2-WHEEL REAR AXLES

Mack's two-wheel, rear axle assemblies have an unmatched reputation for durability under strenuous service. The strongest, most wear-resistant materials are used throughout. Dual reduction, gear-type differential and Mack's famous planetary gear reduction at the wheel hubs (Planidrive) provide the smooth distribution of power needed for top truck performance. Planetary gears can be serviced or repaired without removing tires or disturbing wheel bearing adjustment.

MACK-BUILT TRANSMISSIONS

Dependable performance and long life are standard in Mack transmissions. Shown here is the heavy-duty sweetgear transmission used for the LRVSW, LRSW, and LVX off-highway dumpers. The four-speed main transmission and two-speed compound are assembled as a unit to give eight forward and two reverse speeds. The four-speed main transmission without the two-speed compound is offered in combination with torque converter. All gears use Mack tempered di-quadruplex tooth design and are drop-forged, case-hardened, and generator-ground . . . gears noted for lasting the life of the truck.

MACK-BUILT 4-WHEEL BALANCED BOGIES WITH EXCLUSIVE POWER DIVIDER



Under the worst conditions of mud, loose gravel, or difficult terrain, you get maximum pulling power with Mack's four-wheel drive Balanced Bogies because exclusive Mack Power Dividers apply power to the wheels with traction. Planidrive final reduction gears in all four hubs provide needed reduction without excessively large centers, differentials, or axle shafts. Maintenance is reduced to a minimum.

MACK LRVSW

capacity: 34 tons

The 34-ton rated capacity of this super-payload, six-wheel dumper assures minimum haulage costs for the big earth-moving jobs. Equipped with a 400-horsepower engine, four-speed overgear transmission, hydraulic torque converter or two-speed compound, and a balanced, four-wheel drive bogie, LRVSW's can negotiate severe grades fully loaded. Maneuverability and ease of handling are facilitated by such features as a hydraulic steering booster and air-assisted clutch. Heat-treated, stress-proportioned, single-unit frame gives the structural stamina needed to withstand severest operating conditions. All these features, and many more, contribute to unmatched durability and minimum haulage costs.

CONDENSED SPECIFICATIONS

STANDARD EQUIPMENT

DIMENSIONS:

Wheelbase	16' 10"
Platform	14' 11½"
Overall Width	11' 1⅜"
Overall Height	11' 11"
Overall Length	31' 7"
Overall Height (Body Raised)	25' 2"
Turning Circle Diameter (To outside edge of tire)	78'
Weight (chassis, body & hoist)	68,000 lbs.
Payload	68,000 lbs.

ENGINE (Diesel):

Model	NVH-1200
Make	Cummins
Type	Naturally aspirated
Number of cylinders	12
Bore and stroke	5⅛" x 6"
Piston displacement, cu. in.	1486
Brake horsepower @ 2100 r.p.m. (gov.)	400
Max. torque @ 1200 r.p.m.	1,075 lb.-ft.
Fuel tank and location	150 gal., back of cab

CLUTCH:

Make	Lipe Rollway
Type	Two-plate, dry
Area of engagement, sq. in.	571
Actuation	Manual, air assist

ELECTRICAL SYSTEM:

Voltage and capacity	12 V., 75 Amp.
Generator, make and type	Leece-Neville, alternator

STARTING SYSTEM:

Starting motor, type	Air
Make	Bendix-Westinghouse
Rating, horsepower	25
Cold starting aid	Ether injection

TRANSMISSION:

Type	Mack selective constant mesh
No. of speeds, forward	Four
reverse	One

TORQUE CONVERTER:

Model	Westinghouse 18"
Type	Single stage, hydraulic

FRONT AXLE:

Type	Mack Reversed-Elliott, I-beam drop forged

BOGIE:

Make	Mack Planidrive
Final drive, type	Four wheel, planetary
Inter-axle Differential	Mack concentric cam and plunger type Power Divider
Carriers	Mack dual reduction
Total ratio	18.18

BRAKES:

Type and actuation	Internal expanding, inclosed, air
Front, size	17¼" x 5" x ¼"
Rear, size	20" x 7" x ¼"
Hand, size	16" x 3" x ¼", four-shoe, disc

FRAME:

Type	I-beam, wide flange
Material	Alloy steel
Side-members, size	Depth 14¼", flange width 8", flange thickness 1"
Section modulus	130.0 per side

SPRINGS:

Type	Semi-elliptic
Suspension, Mack	Rubber Shock Insulators

SHOCK ABSORBERS, FRONT:

Type	Houdaille, hydraulic

TIRES (Lug) Front and Rear:

Size	16.00-25 (20P)

WHEELS:

Type	Cast, spoke

STEERING GEAR:

Type	Worm and roller
Power steering assist	Vickers hydraulic booster

CAB:

Type	Heavy-duty off-highway, closed, all-steel, welded. Offset 10¼" to left of chassis center-line provides clear vision for driver to rear.

CHASSIS EQUIPMENT: Screen type radiator guard; hubodometer; front and rear tow pins; air horn; rear view mirror, left side; dual exhaust through hood with inline mufflers; channel type front bumper; rim lug wrench and handle; door in hood side for access to oil filler and dip stick; insulating dash mat; windshield wipers; stop and tail light; back up light.

HOIST:

Make & Type	Heil, twin, double-acting, outboard mounted, four-section telescopic cylinder assembly directly connected to body and chassis through a universal joint arrangement to provide maximum flexibility.
Dumping angle	70°

BODY:

Make & Type	Heil Rock, scoop end
Capacity, line of plate	24 cu. yds. struck

Construction: ¼" steel plate shell bottom; ⅜" sides and header; ½" wear and side bevel plates; ¼" canopy. 3" x 7.1 lb. channels between floor plates either side of a 2" edge-grain hardwood middle section filler.

OPTIONAL EQUIPMENT

TRANSMISSION (In place of 4-Speed and Westinghouse Converter):

Make & Type	Mack Two-Lever, Duplex
Speeds Forward	8
Speeds Reverse	2

TIRES (Lug) Front and Rear:

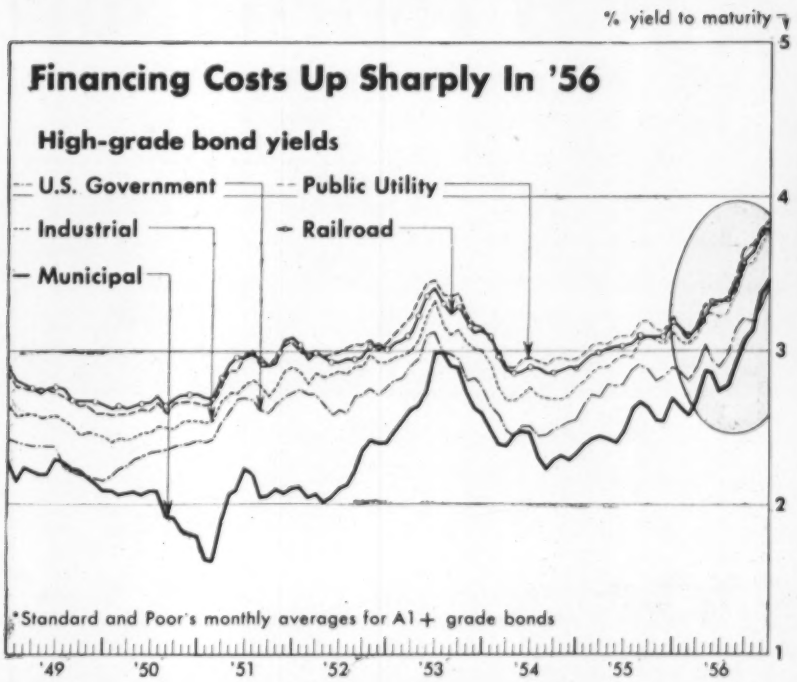
Size	16.00-25 (24P)

BODY EXHAUST HEATING: Provisions to permit passage of exhaust gases through area between wear plate and shell bottom; controlled by baffles and exhausted through second rear vertical bolster on right side.

CHASSIS EQUIPMENT: Front wheel brake limiting valve; 25,000 B.T.U. heater with defrosters; windshield fan; speedometer (single-hand); tachograph, Wagner "BB" 24-hour chart, 0-3500 r.p.m. (in place of standard tachometer); engine fan—Schwitzer-Cummins fan drive with automatic temperature control; exhaust outlet under cab suitable for attachment to body for body heating; 20-ton hydraulic jack; spare rim.

MACK first name for TRUCKS

Mack Trucks, Inc., Plainfield, New Jersey • In Canada: Mack Trucks of Canada, Ltd.



Money Squeeze Crimps the Boom

The construction boom dented its crest against the money and credit ceiling in 1956. With the Federal Reserve Board holding the lid on bank credit to stave off inflation, investors held out for the highest bids on their funds.

In this situation, industry took the advantage and by offering higher returns, took in a record $4.7 billion in construction money from investors.

Other borrowers took back seats in the capital markets. Because the 4½% maximum interest rate on FHA and VA insured mortgages had to compete with more attractive returns, builders faced a growing scarcity of advance commitments on mortgage funds and would-be home buyers discovered mortgage buyers were thinning out fast.

Commercial building, state and municipal borrowers also had a harder time financing new projects. No funds rather than higher borrowing costs apparently forced some stores and shopping centers to be postponed. State and local borrowers had trouble because maximum legal interest rates on new bond issues did not keep up with rising market rates. The chart above shows how interest costs rose on existing high-grade municipal bonds. Rates on new issues were higher.

Late in the year, FHA upped the maximum interest on new home mortgages to 5%, this didn't halt the downtrend in applications. But states and municipalities had good results when they raised interest ceilings.

More money in '57—Money has been expected to remain "tight" this year, but ENR New Capital statistics so far in '57 indicate much more may be available than was anticipated. Municipal bond sales for construction money set a record for the first seven weeks, 44% above last year. Corporate security and stock sales for construction money are also a record, up 149%.

State & Municipal Bond Sales Dip

Bond sales for construction money as compiled by ENR, in millions of dollars

	1952	1953	1954	1955	1956	% change '55-'56
All construction	$3,437.9	$5,031.1	$5,931.5	$5,008.0	$4,780.8	− 5
Buildings	1,593.4	2,114.8	2,018.9	2,132.9	2,000.2	− 6
Schools	1,088.2	1,497.9	1,600.4	1,693.6	1,508.6	− 5
Housing	317.3	283.1	112.4	102.2	91.1	−11
Other buildings	187.9	333.8	306.1	337.1	300.5	−11
Heavy construction	1,844.5	2,916.3	3,912.6	2,875.1	2,780.6	− 3
Highways	843.7	1,393.5	1,740.0	1,260.9	605.7	−52
Bridges	83.0	346.5	309.8	106.3	51.4	−52
Sewerage	228.0	421.5	382.4	355.9	425.7	+20
Waterworks	217.2	326.9	376.2	366.3	395.7	+ 8
Earthwork, irrigation & drainage	21.4	31.5	126.8	95.2	19.0	−80
Unclassified	451.2	396.4	977.4	660.5	1,283.1	+86

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New, low, wide B Fullpak scraper gets *big* loads *fast!* This tested design is fully proven for fast and easy loading — has been in world-wide service for over a year on the modern 18-yd. Model C Tournapull. This companion 27-yard Fullpak loads just as easy and heaps just as fast. Check it against any of today's big production units. Compare it for lowest-net-cost-per-yard.

Loads faster . . . boils better . . . offers many advantages:

The "low and wide" design of the new B Fullpak scraper gets full capacity, low-void pay-loads fast. Side-sheets curve up in center to reduce spillage and deflect material into corners of apron and tailgate. Tailgate has a curved top to roll material into the heap, fill all corners. High, deeply curved apron adds dirt capacity and carries a big part of load forward in its "belly", for better weight distribution, lower center of gravity, and improved stability on any terrain.

Low push-block gives direct-line application of power from pusher to blade. Bowl bottom has only 1° rise. In loading, dirt flow is nearly horizontal — big loads pack in fast.

Powerful, improved 293 hp Model B Tournapull prime-mover has the famous L-W power-transfer differential that keeps pulling-traction on both drive wheels at all times. Power-steer through geared king-pin permits 90° turns. This positive king-pin steer permits swinging prime-mover to let drive wheels find better footing and "walk" out of mud and loose sand.

Push-button electric control and wheel-operated electric steer make handling easy. All-weather electric motors at points of action give instant steering and scraper control.

Heavy-duty transmission provides ten gear ratios, from 2.6 to 28.4 mph. Low gear matches pusher speed, enables "B" to help itself in loading, gives full lugging power for pulling through soft footing. This combination of 10 speeds, plus clutch-brake for fast shifting, means hauling at higher speeds... more pay-yards per hour.

For full details on this new 27-yd. B Tournapull, see your LeTourneau-Westinghouse Distributor. Analyze your earthmoving requirements. See how this BIG "B" with new *fast-loading* Fullpak scraper can earn big dividends for you on future work.

Tournatractors

Rear-Dumps

Adams Graders

Adams TraveLoaders

Bottom-Dumps, Cranes, Flat-Beds, Elegraders, Rollers, Snow-Plows, Logging Arches, Scrapers, PCU's, Rooters, Root Rakes, Wire Rope.

with 27-yd. FULLPAK scraper

1. Low, wide Fullpak scraper: 27-cu. yds. heaped, 19.1-cu. yds. struck, 32.5 tons.
2. High-lift apron. Big opening (7'1" high x 10') makes sure anything that goes in will come out!
3. Deflectors on yoke arms, and smooth, wide apron side-arms, prevent trapping of rocks, and other chunky materials that might slow up operations and involve manual clearing.
4. Curved deflector on tailgate rolls dirt into center of bowl for bigger pay-load.
5. Streamlined bowl has no obstructions to interfere with boiling flow of material.
6. Large diameter cable-drum on apron-hoist permits fast spooling without kinking, increases rope life.
7. Power steering wheel gives easy handling through positive electric control.
8. Cockpit is raised to give operator clear visibility. He can see both load and pusher at all times.
9. Scraper wheels are easily removed, and interchangeable with wheels on prime-mover. Outboard bearings give stable load support.
10. Multiple-disc air brakes, and sturdy brake elements, give quick stopping power, longer service.
11. Heavy cross-tube ties side sheets rigidly together on low, wide Fullpak bowl.
12. Constant voltage transformer provides accurate control at low engine RPM.
13. Quick-release clutch and fast electric-hoist allow rapid bowl "pumping".
14. Large push-plate, of all-welded, reinforced box-type construction, provides big pusher target, keeps contact over uneven terrain.

Brief Specifications for New B Fullpak Tournapull:

Capacity: Tons 32.5
Heaped, cu. yds. 27
Struck, cu. yds. 19.1

Power: 293 HP Cummins Diesel

Tires (Std.): Four 27 x 33 — 30-ply rating

Speeds: Ten forward 2.6 to 28.4 MPH
Two reverse 2.4 to 3.5 MPH

Turning Angle: 90° left or right

Width Required for 180° Turn: 39'10"

Control: Fingertip Electric

Brakes: Multiple-disc air brakes with 6552 sq. in. of braking surface

Dimensions:
Length .....44'0"
Width .....11'8½"
Height .....12'2¼"
Wheelbase .....26'10"

Shipping Weight (approx. lbs.) 68,900
(Specifications subject to change without notice.)

High-lift apron — positive ejection: Apron opens 7'1" to speed loading and unloading. Positive forward ejection of load wipes bowl clean of all materials, including mud and sticky clay. Low, wide bowl permits bigger heap, gives low center of gravity, provides greater stability in all working conditions. Smooth, wide side-arms and side-sheets of apron will not trap chunky materials that might hinder loading and unloading operations.

Low, wide bowl — heaps full-capacity, low-void pay-loads *fast*. Inside bowl is smooth, streamlined — has no reinforcement ribs to hinder dirt movement. Low push-block gives direct-line application of power from pusher to blade. Quick-release clutch, and fast, electric hoist, make possible rapid "pumping" of bowl for speedy loading of loose materials. Wheels inside cutting edge aid in precision grading, permit cutting against bank.

Tournatractor, Tournapull—Trademark Reg. U.S. Pat. Off. BP-1388-G; Fullpak, Adams—Trademark

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

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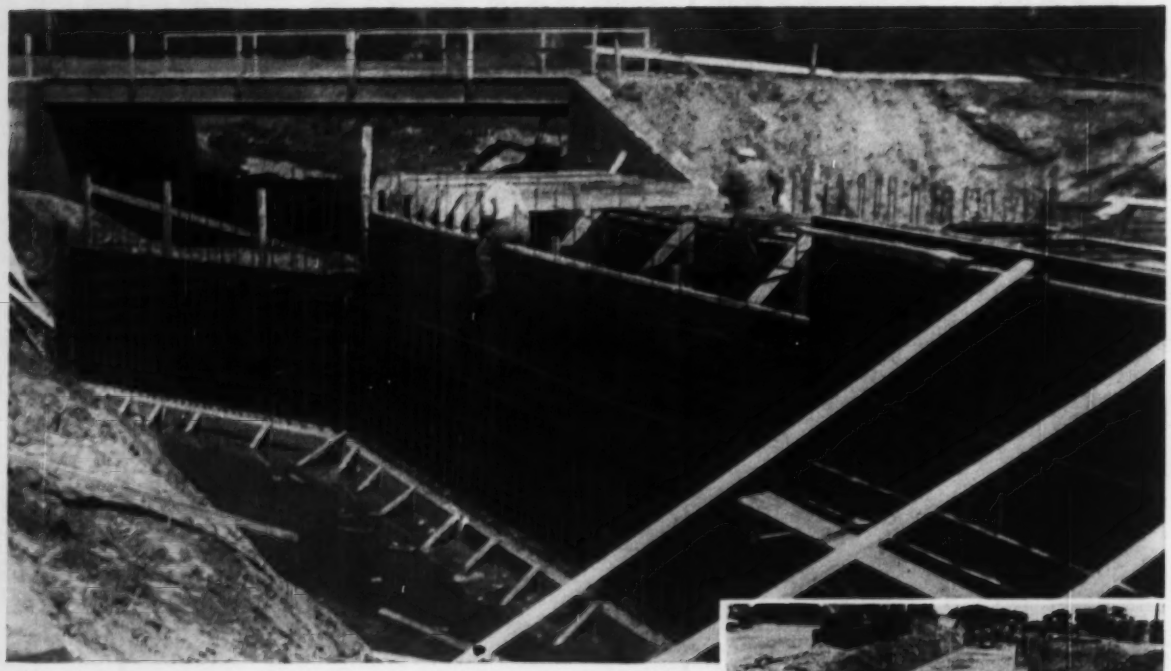

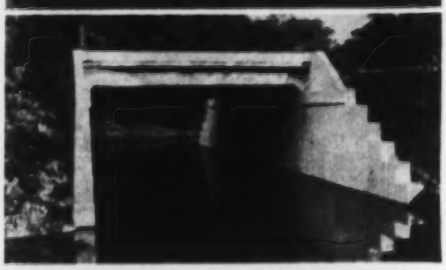

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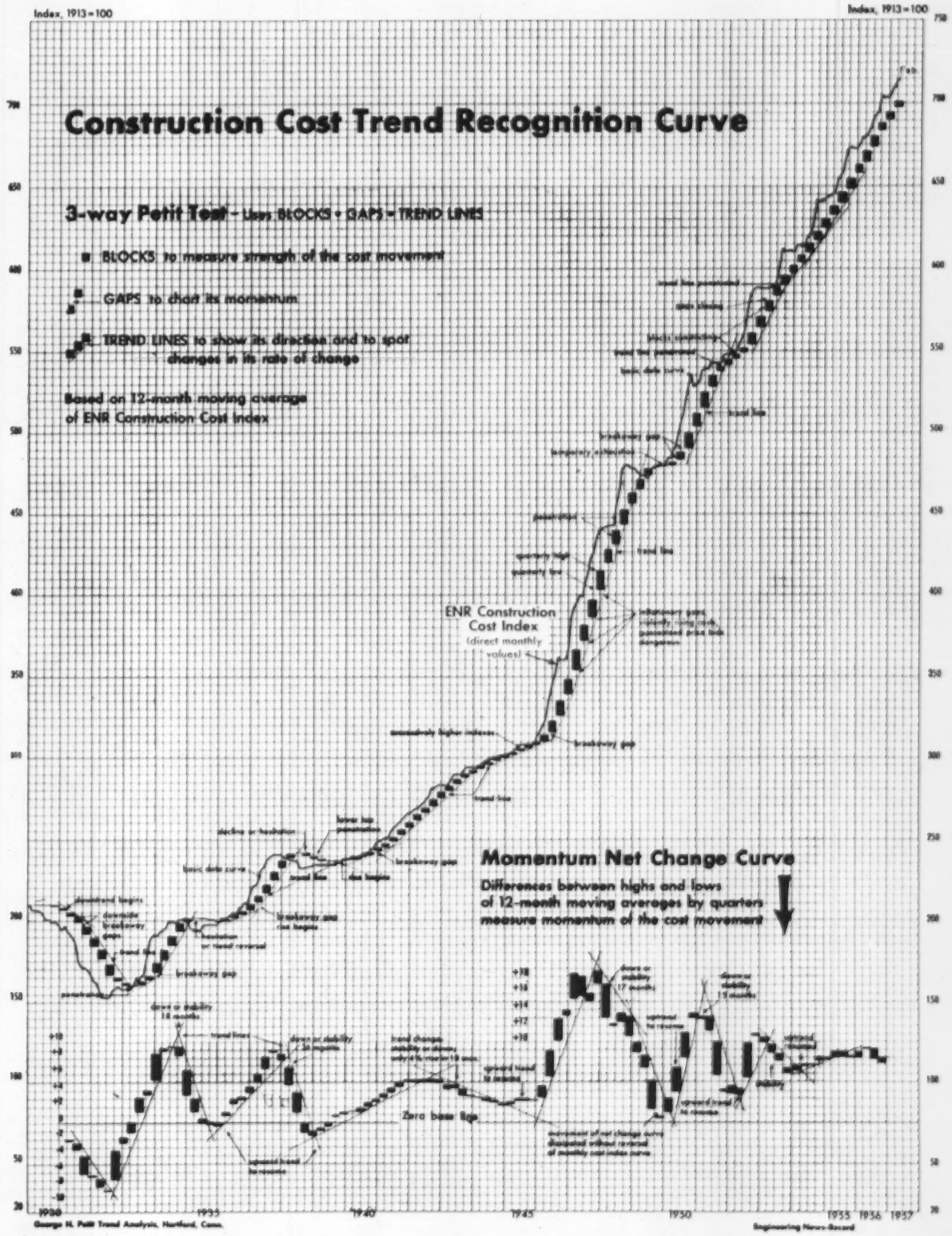
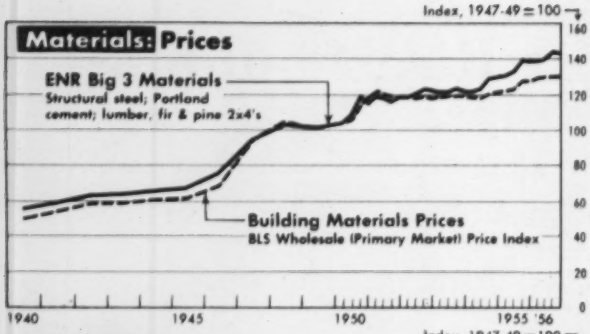
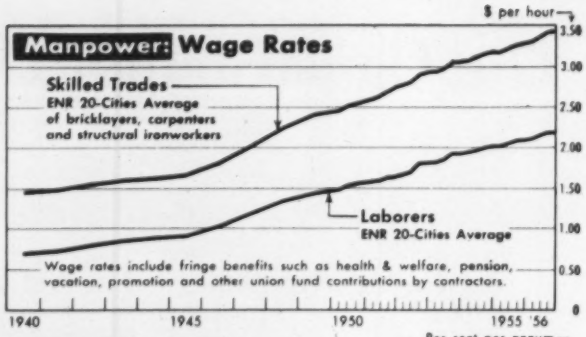
3. UNI-FORM Tie Key

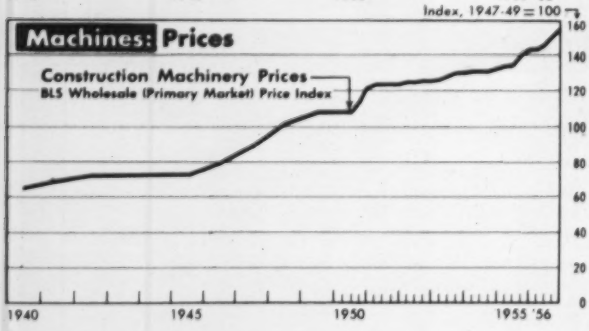
1. Steel framed, plywood faced UNI-FORM Panel

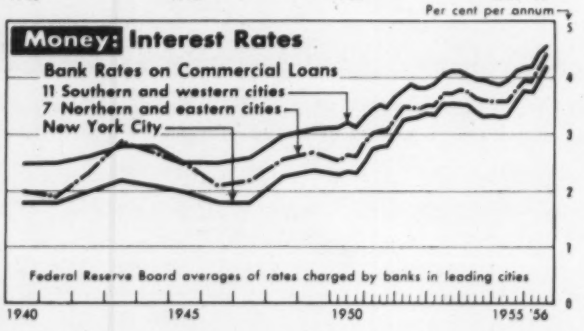
The Construction Cost Rise Continues


Index, 1913 = 100
Index, 1913 = 100
Construction Cost Trend Recognition Curve
3-way Petit Test - Uses BLOCKS + GAPS = TREND LINES
BLOCKS to measure strength of the cost movement
GAPS to chart its momentum
TREND LINES to show its direction and to spot changes in its rate of change
Based on 12-month moving average of ENR Construction Cost Index
ENR Construction Cost Index (direct monthly values)
Momentum Net Change Curve
Differences between highs and lows of 12-month moving averages by quarters measure momentum of the cost movement
Zero base line
1930
1935
1940
1945
1950
1955
1956
1957
George H. Petit Trend Analysis, Hartford, Conn.
Engineering News-Record




$ per hour
Manpower: Wage Rates
Skilled Trades
ENR 20-Cities Average of bricklayers, carpenters and structural ironworkers
Laborers
ENR 20-Cities Average
Wage rates include fringe benefits such as health & welfare, pension, vacation, promotion and other union fund contributions by contractors.
1940
1945
1950
1955 '56





Four-Way Pressure on Construction Costs

Contractors paid higher prices for all four major items they needed to fabricate new construction in 1956—materials, manpower, machines and money. The combined effect of the four-sided pressure was a further rise and a new record high for construction costs.

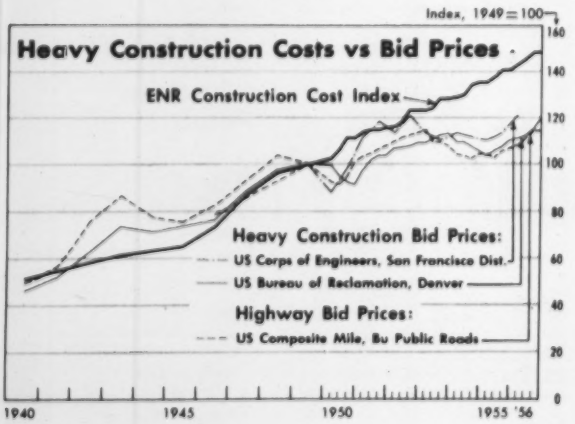
The ENR Construction Cost Index rose 4.6% between December '55 and December '56, while the Building Cost Index increased 4.5%. Responsible for this uptrend in what contractors pay for materials and labor were increases of: 8.7% in structural steel (3-mill average); 6.5% in Portland cement; 4.3% in skilled wages including fringes; and 4.5% in common labor wages including fringes. Lumber was the lone item in the ENR Indexes with little net change, up 0.2%, as early increases were offset by declines later in the year.

Construction machinery prices rose an average 8.7% last year on top of 1955's increase of 8%, according to the Bureau of Labor Statistics Index. Much higher interest charges on bank loans added to the costs of financing equipment purchases and working capital.

...Causes Price Increases

Contractors passed these cost increases on to construction buyers. Sharp increases in bid prices on highways and heavy construction pushed them up to record highs. Building price indexes also set new highs.

(Continued on page 84)



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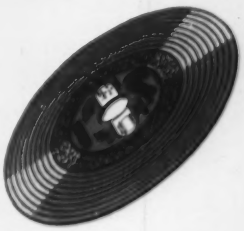

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. . . Price Increases

The biggest increases in 1956 prices charged by contractors were on heavy construction. Bid prices rose 9% during the 12 months ending October '56, according to the Composite Cost Index computed by the Denver office of the US Bureau of Reclamation. And prices bid on projects in the western states rose 9.5% between the first half of '55 and the first half of '56, according to the San Francisco District of the US Corps of Engineers Index.

Highway contractors raised their bids on federal-aid highway projects to a new record high. The fourth quarter Composite Mile Bid Price Index compiled by the US Bureau of Public Roads topped 1952's previous high for the first time. Though the bid price rise tapered off in the fourth quarter, the Composite Index was 7.3% above the final quarter of 1955.

Building contractors also raised their selling prices in 1956. The average of four contractor price indexes (Austin, Fruin-Colnon, Fuller and Turner) for 1956 increased 6.4% over 1955, a much sharper rise than the 2.7% in 1955 or the 1.4% in 1954.

These 1955-56 increases in contractor prices were considerably greater than the corresponding rise of about 4.5% in basic materials and labor costs measured by the ENR Cost Indexes.

Slower Cost Rise in '57—The construction cost trend will continue up this year, but ENR forecasts that the rise will be less than in 1956. The Construction Cost Index is expected to increase by 3.4% by December, 1957 to a new high of 728, based on 1913=100. The ENR Building Cost Index is forecast to increase 2.6% by December to a new record 513, also based on 1913=100.

This forecast is based on these estimates for the components of the Indexes: structural steel up 5% (3-mill average); Portland cement up 4%; lumber down 2% (average of Douglas fir and southern pine); skilled wages up 3.2% including fringe benefits; and common labor wages up 4.1% including fringes.

Contractor Failures Jump 31%

A record 1,843 contractor failures in '56 was grim evidence of the construction industry's price squeeze and management problems. A drastic 60% increase to 708 failures of general building contractors accounted for the most of the rise, according to Dun & Bradstreet. Contractors doing construction other than building showed a 19% increase to 96 failures. Subcontractor failures were up 17% to 1,030.

Why the increase?—Competitive weakness is the major cause of rising contractor failures, according to Dun & Bradstreet's analysis of firms going under during the 12 months ended June '56. This cause was apparent in 28% of the failures during this period, compared with 22% in the year 1954.

This weakness grew out of poor management. There was a big increase in the percentage of contractors going broke because they lacked managerial experience or experience in the type of construction they were doing. Significantly, the percentage of failures due to "incompetence" has dropped sharply (see table.)

Why Contractors Fail— Dun & Bradstreet

% of Total Contractor Failures		UNDERLYING CAUSES	APPARENT CAUSES	% of Total Contractor Failures	
1954	Jul. '55-Jun. '56			1954	Jul. '55-Jun. '56
40.8	40.8	Incompetence	Inadequate sales	31.6	29.8
			Competitive weakness	22.1	27.7
15.4	22.4	Lack of managerial experience	Heavy operating expenses	23.1	14.9
			Receivables difficulties	14.9	15.1
21.9	20.4	Unbalanced experience*	Excessive fixed assets	5.1	5.9
			Inventory difficulties	1.4	1.2
			Poor location	0.5	0.2
4.9	8.2	Lack of experience in the line of work	Other	6.3	10.1
4.4	4.1	Neglect	Poor health	2.7	2.1
			Bad habits	1.1	1.3
			Other	0.6	0.7
1.8	1.8	Fraud	Irregular disposal of assets	0.9	1.2
			False financial statement	0.4	0.3
			Premeditated overbuy	0.2	0
			Misleading name	0.1	0.1
			Other	0.2	0.2
1.1	0.9	Disaster	Strike	0.3	0.3
			Fire	0.2	0.1
			Employees' fraud	0.2	0.1
			Flood	0.1	0.1
			Other	0.3	0.3
0.7	1.4	Reason Unknown		....	...

* Management's experience not well rounded in sales, finance, purchasing and product on.

Louis B. Sacco, maintenance foreman, J. Henry Harris, contractor, Berkeley, California

"T5X makes my job easier"

"My job of maintaining 250 pieces of construction equipment is made easier by using T5X Motor Oil in all engines, gas and diesel.

"Take this Mack with the NH200 Cummins—we just finished tearing it down after 150,000 miles. It was so clean and showed so little wear that we had it back on the job in record time. There wasn't a bit of sludge in the pan and the liners showed so little wear that we didn't touch them or even replace the rings. The only replacements were new rod bearings, a precaution taken while the engine was down.

"This is no record with us, however. We have another Mack with many more miles on it than this which hasn't had the head or pan off in more than 5 years, and it's still going strong."

What Mr. Sacco says is true. T5X Motor Oil can make motor maintenance easier and certainly less costly—from the standpoint of labor, parts and downtime. If you're not yet using the *amazing* purple motor oil, we suggest you place your next order for oil with your nearby Union Oil representative. Ask for T5X.

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Dallas: *313 Fidelity Union Life Bldg.* • ***Kansas City, Mo.:*** *612 47th St.* • ***New Orleans:*** *644 Nat'l Bank of Commerce Bldg.* • ***Boston:*** *214 Harvard Ave.*

IN THE COUNTRY, as at this county road intersection in mid-Ohio, the broad patterns of the interstate highway system's limited-access roads are already beginning to create a landscape of their own, change the nation's travel habits.

$100 Billion Highway Program

There was only one big event in the transportation field for 1956—though there were a number of important, but smaller, ones.

Passage by Congress in late June—after two years of false starts—of the Federal Highway Act of 1956 topped all other news. At the moment the bill was passed, Congress transformed what had been a "grand plan" for highways into something else: A $100 billion challenge to the nation, and very particularly to the construction industry.

That challenge ranges across the board for highway engineers, administrators and builders—and it must inevitably involve every other member of the construction industry, many members of the legal profession, and most public officials for many years to come.

The scope of the challenge is so immense that it is only now becoming clear, even to the men most intimately connected with it. The obvious problems of revising the laws of nearly half the states; of finding men with engineering skills to prepare the plans; of making the necessary studies; of administering the law to the best advantage of the nation, are only the top of the iceberg of difficulties that face all concerned.

When it passed the highway act, here's what Congress did:

1. Set up federal funds totalling $24.8 billion, to be apportioned to the states on a 90%-federal, 10% state matching basis, over a period of 13 years, for use on a new classification of highways—the 41,000 mile "Federal System of Interstate and Defense Highways."

2. Set up federal funds of $2.5 billion, to be apportioned to the states on a 50-50 matching basis, for use on the already-designated primary and interstate highway systems (about 800,000 out of the nation's roughly 3,300,000 miles of roads) for a three-year period.

3. Set up a program of user taxes expected to produce $14.8 billion for the federal government over a period of 16 years.

4. Imposed conditions of the Davis-Bacon Act, in relation to wages paid labor on the interstate roads.

5. Placed size and weight restrictions on trucks for the interstate system—18,000 lb on single axles; 32,000 lb on tandem axles, and gross weights of 73,280 lb.

6. Provided that a series of studies be conducted by the Bureau of Public Roads, to be used as basis for amendments and revisions of the law after three years. These studies, the first two of which are to be completed by January, 1958 the rest by March of 1959 encompass:

A more accurate cost estimate for the interstate system; a look at methods of reimbursing states for roads already built that meet interstate standards; a study of additional costs that would be involved to meet demands of heavier trucks and other users; a series of recommendations for maximum sizes and weights of vehicles; and a study of designs aimed at traffic safety.

Some of the needed information will come out of a new test road now under construction in downstate Illinois, some from results of another test-road (both under sponsorship of the American Association of State Highway Officials) near Malad, Idaho; a great deal more from studies conducted by the states at the behest of BPR, and from BPR's own staff and records.

• **New standards**—Shortly after passage of the highway act itself, the states and the BPR—acting through the AASHO—adopted a complete set of standards for the interstate system roads, standards that had been under discussion for more than two years, but which were held in abeyance pending actual legislation.

Designed to be broad and basic, the standards stick to fundamentals, leaving details of application to the already comprehensive AASHO manuals on design. Very briefly, they call for:

Minimum lane widths of 12 ft, with 10-ft surfaced shoulders; design vehicle speeds of between 50 and 70 mph; divided roadways (with a few exceptions where traffic by 1975 doesn't warrant); median widths of 36 ft, where possible; right-of-way widths varying between 150 and 300 ft; grades of 3 to 5%, excepting in very rugged terrain.

The standards are, of course, general guidelines, and will have to be expanded by BPR in a series of supplemental policy directives—one very

IN THE CITIES, new and complex structures are going up, changing the appearance of San Francisco (left) and many another metropolis, as the new roads cut through, over or under congested areas to provide better communications.

Takes the Transportation Spotlight

particular example being provision for frontage roads. Another will be the traffic basis for design, since the Highway Act requires that the roads be adequate for traffic as of 1975—including attracted, generated and development traffic.

Grade separations are required for all rail and highway intersections, with the single exception that in sparsely settled rural areas, side roads now averaging less than 50 vehicles a day may enter or cross the interstate route at grade. But state authorities must retain the right to eliminate such junctions at any time traffic warrants such action.

• **Get it running**—With the highway bill now law, and with a real scramble beginning on a number of fronts for mileage, funds and direction, Congress and the Administration both turned to the problem of administering the program.

Both sides agreed on one thing—and without any prejudice or criticism of the incumbent: It was too much to ask of the Commissioner of Public Roads.

The reason was simple enough: Under the existing laws, C. D. Curtiss, head of the BPR, already had at least five jobs: He was head of a major department, with more than 3,600 employees and with offices and agents scattered throughout the United States and in many countries of the free world; he was a sub-cabinet officer with numerous duties involving briefing and conferring with Administration and Congressional leaders and committees; he was chief engineer of what constitutes one of the world's largest engineering staffs; he was responsible for scientific research and development through BPR's membership in various research organizations; he was arbitrator and federal liaison man in disputes between the states and their own communities, between the states themselves, and between state and federal governments in matters concerning highways.

To impose on these multifarious duties the added job of administering such a tremendous 13-year construction program as the law now sets up, was admittedly too much. The difference between Congress and the Administration was only in method: Congress wanted a three-man commission to handle the program, the Administration wanted to name a single administrator. After considerable debate, the Administration plan won, and President Eisenhower, to fill the spot, get the program off the ground—and preclude political argument—named two very well known administrators in a somewhat odd game of political musical chairs.

John A. Volpe, who had just resigned after nearly three years as Massachusetts Public Works Commissioner, agreed to take over as interim administrator for a few months, until New York Thruway Chairman Bertram D. Tallamy could wind up his affairs in Albany and take over the post on a permanent basis early in 1957.

• **Program going**—The program, at year's end, was rolling along—a lot faster than many observers thought it could go, but not nearly fast enough in the eyes of others.

First step was to pin down the long-established general location of the interstate system to definite final locations. In some cases, that has been easy—terrain and other circumstances allow little alternative. In others it has been a tough decision, affected by costs of right-of-way, requirements of limited access, gaps in state laws, local opposition and the like. Toughest problem is in the major cities—which looked upon the program as a major windfall toward settling their own vexing problems of traffic strangulation.

The problem has been further complicated by a joker that Congress put into the highway act—it added 1,000 miles to the already agreed-upon 40,000-mile system. Where that extra mileage would go, how it would be justified, were left open, and the states began a contest to get some of it. By the end of the year, proposals for extra mileage had run up as high as 12,000 miles—and there was some prospect that the new Congress might amend the law to include some of it this year.

At all events, by the end of the year, contract awards for the Interstate System were running at about $20 million per week—about half the rate needed to meet the appropriations schedules. The figure, however, was deceptive—a lot more work had been

SNOWBOUND EQUIPMENT is ready at Ottawa, Ill., site of the newest AASHO-sponsored test road.

done than it indicated. In fact, earliest contracts let were usually for roads long since planned either in anticipation of the program, or that would have been built anyway to satisfy pressing needs. But many new plans were under way, many of the locations had been fixed. And the first three weeks of 1957 saw contracts being let at a $50 million a week clip.

• **The computers**—The year 1956 might also be marked down as The Year of the Computers.

Under the tremendous spur of the highway program—and the obvious lack of enough skilled technical personnel to meet the design needs for the newly expanded highway programs—engineers were forced to turn with renewed interest to mechanical means of supplementing their own efforts.

Chief among these means were photogrammetry and the use of electronic computers—neither of them new techniques, but both new on a large-scale basis to many in the profession. Sponsored by the BPR, the Highway Users Conference, AASHO, manufacturers and others, meetings were held throughout the United States during the year to acquaint engineers with the workings and capabilities of the computers and other equipment that might be used to speed up design work.

At the same time—and for the same reason—the profession began to take a long and careful look at its own time-honored operations, in the certain knowledge that antiquated techniques and habits of thinking and working could be speeded up or eliminated, to produce more design work.

The problem was primarily one for the engineers. There was no doubt at all that the contractors had the capacity and the machines to do the needed work—or that there would be any serious shortage of materials or machines.

• **Tollroad boom ends**—Partly because of the passage of the highway bill, the year 1956 marked the virtual end of the tollroad boom.

As 1957 started, seven major toll roads were still under construction—Illinois, Massachusettes, Connecticut, New Hampshire, New York, Oklahoma and Louisiana. But all of these were projects previously committed.

An additional reason for the tollroad letdown became apparent as 1956 went along, with disappointing return on newly-opened pikes, notably in Kentucky and West Virginia, but even affecting such long-established moneymakers as the Pennsylvania Turnpike. It became obvious that the best locations for the toll roads had already been preempted—that any new roads would perforce be marginal propositions.

This fact, added to the impact provided by the federal highway bill, which now offers the states the chance to get major highway connections at only 10% of their cost, spelled the end of the toll road boom.

That's not to say, of course, that existing tollroads are not doing well. Maine, New York, New Jersey, Pennsylvania—even Ohio's new road, which righted itself after a disappointing start—are meeting their commitments. But the governors of Kentucky and Pennsylvania—for two—were already hopefully looking to the federal highway act as a means of unloading their turnpikes, paying off the bondholders and declaring the roads free. Still, those who hope for such reimbursement must wait. The 1956 act specifically left the question open pending studies of the problem.

• **Bridges, tunnels, boom**—In connection with the general rosy prospects for highways, 1956 was a really big year for bridges and tunnel construction.

Three major vehicular tunnels on the eastern seaboard were in various stages of completion—New York's $100 million Third Tube for the Lincoln Tunnel was due for opening in the spring, so was Virginia's Hampton Roads (Norfolk) bridge-tunnel, and Baltimore's Patapsco River tunnel was moving on schedule. Plans also went forward for a second tunnel under the Elizabeth River at Norfolk, and Virginians appropriated $250,000 for a study of a causeway and tunnel to cross the mouth of Chesapeake Bay to connect the DelMarVa Pensinsula with mainland Virginia.

Bridges of all sizes were prominent in the construction news, ranging from good progress on the huge Mackinac Straits Crossing in Michigan to the 24-mile long, newly completed trestle-bridge across Lake Pontchartrain just north of New Orleans. Near completion are the suspension-span Walt Whitman Bridge across the Delaware south of Philadelphia and the four mile long, double decked cantilever Richmond-San Rafael bridge across the northern arm of San Francisco Bay in California. Included in the roster were work on the $65 million cantilever bridge across the Mississippi at New Orleans; a new Broadway bridge across the Missouri at Kansas City; New York's 4,400 ft, continuous deck-truss Kingston-Rhinebeck crossing of the Hudson, the Point Bridge at Pitts-

burgh, a new causeway and bridge across Tampa Bay in Florida, and many others.

Two developments were worthy of particular note: Increasing attention to prestressed concrete members for bridges; and a speed-up in the effort to standardize design of the thousands of small bridge structures that will be necessary to meet the limited-access and other needs of the new highway plan.

The interest in prestressing—spurred by the steel strike during the early summer, and the resultant shortage of steel; and by the desire to hold down construction costs—extended to such major structures as the Pontchartrain causeway, and the piling and deck of the Hampton Roads bridge-tunnel, but was also apparent in designs for much smaller crossings. The need for standardization—as another attack on the problem of shortage of designers—was reflected by BPR in its most recent standards for bridge design (which included a whole new series on prestressed designs), and by Pennsylvania, for instance, which worked out a set of standards to be used for quick bridge replacement in the event of disaster such as a flood, and also for use on new roads.

In San Francisco, chances for a new and much-needed second crossing of San Francisco Bay to Oakland receded farther from realization. By legislative order, the California Toll Bridge Authority is committed to build a trestle-and-tunnel crossing, somewhere south of the existing bay structure. But studies during 1956 made it clear that this crossing couldn't be financed, unless toll charges on the existing bridge were raised. Among the reasons is the increasing caution of investors—who have noted that the recently-opened Richmond-San Rafael Bridge across the north arm of the bay has been carrying substantially less traffic than was predicted (although not enough to jeopardize the bonds that financed it).

Meanwhile, traffic on the Bay Bridge still increases—and is setting new records in driver frustration.

In Seattle, there is a somewhat similar problem. Everyone agrees that a second crossing of Lake Washington—west of the city—is needed, and nearly everyone agrees that this new crossing should be a floating structure. Problem is, where to put the bridge, so as to do least damage to scenery, feelings and property, yet most good in carrying traffic.

ON THE EAST COAST Port of Boston's biggest job, a $10 million rehabilitation of South Boston Army Base, involves casting more than a mile of monolithic concrete seawall.

• **Port activity stirs**—Facing up to the fact that obsolescence is fast reducing the usefulness of their facilities, seaports all around the perimeter of the United States began to show real progress towards modernization, with programs that will involve expenditure of more than a half-billion dollars over the next few years.

Ports along the Atlantic Coast had an added spur in the imminence of the St. Lawrence Seaway, which—within another year or two—will make the cities along the Great Lakes seaports of real proportions.

The main reasons, however, remained the fact that port facilities in most major cities along the east coast are shockingly out of date and inadequate—piers built for sailing ships can't handle modern cargo vessels except by makeshift expedients; narrow, column-filled structures don't lend themselves to efficient mechanical cargo handling; many of the structures are notable fire hazards; progressive clean-up of harbor waters has exposed many structures to attack by marine borers.

Biggest port development on the books is in the New York area, where the bi-state Port of New York Authority and New York City's Department of Marine and Aviation, between them, now have plans and work started on a program that will cost more than $300 million. Of this total, PNYA has work under way now on more than $100 million of facilities, including an $85 million rehabilitation of a large section of Brooklyn's waterfront, and work in Jersey City, Newark and Hoboken. The city itself expects to begin $63.7 million worth of work on its own piers.

Next in line is New Orleans, with a $72 million program that port officials are sure will insure the city's present position as the No. 1 Gulf port.

Other major programs, on which work is now under way, include Philadelphia, with a $50 million program started; Boston, with more than $20 million planned; Baltimore, Providence, Galveston, New Orleans, Long Beach, Los Angeles, Portland, Ore., Seattle and San Francisco—where the state has spent $35 million since World War II.

On the Great Lakes themselves, cities have been inclined to take a "wait and see" attitude for several years, have spent money and time on surveys but little on actual construction work. However, as the year ended, activity in these ports suddenly spurted upward, with plans being pushed forward at Chicago,

PORT EXPANSION at Long Beach, Calif., included construction of this $1.5 million transit shed. Of more than $8.7 million spent on the port in 1956, one-quarter went to combat the port's special problem of land subsidence.

Cleveland, and in the Canadian cities of Toronto and Montreal.

• **Airports**—Although airport designers were still pretty much in the dark as to what the aircraft industry could and would produce to further outmode existing airports, there was considerable activity in attempts to modernize the facilities from the viewpoint of freight and passenger handling.

An outstanding example of this trend was the Port of New York Authority's huge Idlewild Airport—where a nine-year-old quonset type "temporary" administration building, which has been one of the nation's most unsightly and confusing terminals, is finally to be replaced. What will replace it is a pacesetter for other airports: A terminal city, rather than a single administration building, consisting of looped roadways around which individual airlines will build their own passenger and freight handling terminals, with a central building for foreign aircraft operations.

Other cities, notably Houston and New Orleans, were also at work on their air terminals. Detroit had proposals before it for a complete new airfield, and Chicago opened its huge O'Hare field for operation, to supplement Midway Airport—already rated the world's busiest.

There was, of course, some work going forward on runways, hangars, taxiways and the like. But designers were caught between the need to provide for today's planes and those of the future—and the insistent economic fact that expansion of city airports can't go on indefinitely.

The problem is that jet aircraft, with their thin wings, heavy fuselages and powerful engines, cannot climb quickly on takeoff—must have a long, comparatively flat trajectory; and that their landing speeds are so much greater than conventional aircraft that longer runways are needed to control the ships once they have touched the ground.

Airport designers clung to the hope that the aircraft industry would come up with something approximating the reversible-thrust propellors now standard on piston-driven craft, to bring the ship down to manageable speeds within a reasonable distance, before wheel brakes are applied.

On the military side of the airport picture, however, there was big and spectacular enough news:

The Air Force, said Air Installations Chief Lee B. Washbourne, will build no more runways with flexible-type pavements. Further, even on rigid portland-cement pavements in the future, the service will demand what seems to be fantastic accuracy—within plus or minus ¼ in. for every sixteen lineal feet of runway. First job to be built to these exacting standards will be the 12,000 ft runway at Dow Air Force Base in Maine, now under construction.

The Air Force reason for its decision stemmed from the characteristics of its jet planes. The new craft, with their extreme weights (the B-52 bomber, for instance, weighs 400,000 lb at takeoff; the F-102 delta-winged fighter has a fuselage fully as large as the familiar DC3 of airline fame), cannot support their wheels in the wings, as has long been standard practice. Instead, the wheels must be placed in tandem in the fuselage. And, at landing speeds up to 180 mph, even minor irregularities in the runway pavement are transferred directly to the pilot's station, causing the plane to "porpoise" and seriously endangering the control of the craft, which the Air Force points out represents an investment of about $8 million in the case of the B-52.

Not at all prepared to abandon the field, asphalt interests began work, as the new year started, toward development of new specifications that might satisfy conditions created by jet planes.

• **Urban problems**—In the field of urban transit, there was as usual much discussion, but no more than piecemeal progress toward solving the choking traffic conditions in every urban center.

As in past years, concentration was on attempts to get traffic off the streets, once it reaches the city centers, through construction of off-street parking facilities. In many cities, police and engineers experimented with one-way avenues and streets, with attempts to route surface mass-transit vehicles out of the main business centers, and other schemes. But the traffic problem grew apace, anyway.

The real answer, in the opinion of many experts, is greater use of public mass transport facilities—and there was a possible glimmer of hope for that eventuality in the nation's biggest city; New York's Transit Authority reported an increase in subway travel, for the first time in nine years—a rise of 6,000,000 passengers for the five months ending with November over the comparable figure for 1955. The commissioners, viewing the long-term downtrend, chose to take a cautious view of the situation, however, said they'd wait for more facts before deciding whether the uptrend was merely a stabilization, or was in fact a sign of better things.

Meanwhile, most cities—New York included—looked hopefully to the federal highway plan to help them out of their traffic troubles. Freeways and expressways largely paid for by the federal government, might be the answer

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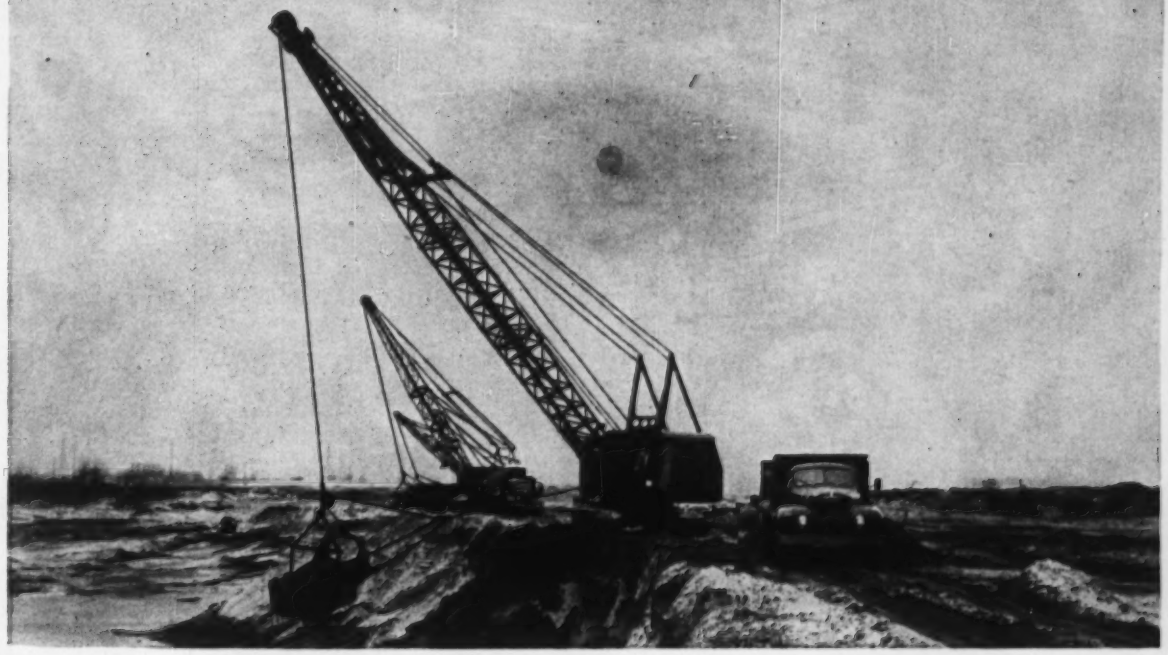

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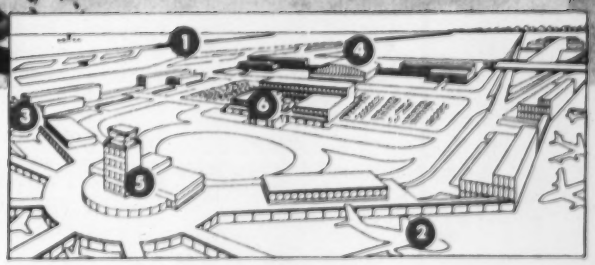

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—figured many a city official—to getting some of the traffic out of town, or at least through it quickly.

• **Railroads**—Following up their apparent determination to put themselves in position to offer better competition to highway transport, the railroads quietly went about modernizing their track and equipment. In the course of this work, they spent money on construction to rectify bottlenecks in their lines, revamp their terminal setups build and re-equip freight yards and terminals.

Of greatest interest to other construction men, however, were two things the railroaders did:

Determined to get their share of the younger engineers they need to carry on and keep their plant in top shape, they upped starting salaries, and began to find means of short-cutting time-honored seniority systems, to provide quicker advancement.

And more and more railroads reported they were using outside construction contractors for track and structure work—mostly on actual replacement or new alignment. More, the railroads were beginning to be a bigger factor in another field—that of construction equipment. Traditional on-track machines were being replaced rapidly by conventional earthmovers, rubber-tired cranes and similar machines.

Most spectacular railroad construction job—handled by outside contractors (Morrison-Knudsen), by the way—was the Southern Pacific's mammoth plan to build a solid fill across the Great Salt Lake in Utah, to replace the famed trestle that supports its Lucin cut-off. Two miles of conveyor belting will bring rock for the fill to the lake's edge, from where barges will transport the more than 31,500,000 cu yd needed for the structure.

The old wood trestle has been a constant maintenance problem for the road (part of it burned out and had to be replaced during the early summer), and its single track enforced slow speeds on crack transcontinental trains crossing it.

• **Pipelines**—The unusual and the spectacular has become so much the commonplace in the field of pipelining that the year went by with little notice of what the pipeliners were doing.

Yet they put down vast mileages of pipe to carry liquids and gas—some to connect U.S. fields with distribution centers, more to bring fuel into the U.S. from Canada and Mexico. In Canada alone pipeliners put down 3,100 miles of line, at a cost of about $300 million, during the year; and they were at work on a 2,500 mile cross-country pipe to carry natural gas from the west coast to eastern border cities.

The most peculiar job for the year was in Canada—on a 650 mile line from the Peace River fields near Vancouver to the U. S. border, by which muskeg forced use of wellpoints to hold excavations, and concrete weights had to be placed on the pipe to keep the line from rising after it was completed.

Major Transportation Projects

• **New Hampshire Turnpikes**—The state has open or under construction a total of 64 miles of four lane, asphalt and stone, divided highway. The mileage is on two pikes both designed for 70 mph speeds (although the legal limit will be 60 mph). Both pikes have a maximum grade of 3%, a maximum turn of 3°, and both will be in operation by Labor Day. The roads are:

Spaulding Turnpike—Running from Portsmouth to Rochester, this $12 million highway is open from the coast to Dover—balance of the project is under construction.

Everett Turnpike—Of the 17 contracts on this 40 mile strip (Concord to the Massachusetts line), 8 are finished and the remainder are 40 to 90% complete.

• **Massachusetts Turnpike**—The 123-mile $239 million toll road running from Boston to the New York state line was put behind schedule principally by bad weather, and the steel strike. The ribbon cutting ceremonies, originally set for Nov. 1956, have been postponed until this spring—probably in May. Although more than 85-90% complete, there are intermittent short stretches unpaved and a few small bridges awaiting steel.

• **Boston Central Artery**—One of the most expensive and difficult road jobs in the U.S., this four miles of elevated and underground highway bisects the heart of Boston. On completion it will provide local traffic quick access to most of the city's main streets while permitting uninterrupted travel for through traffic. Although construction on the $100 million project was started in 1951, only 1.6 miles is open. Remainder of the work is under construction or in advanced stages of planning, and completion is set for 1959. One part now under construction is the 2,400 ft $18 million cut-and-cover tunnel between Congress and Kneeland Streets. So complex are the construction problems involved that one 200 ft long section of the tunnel (Dewey Square in front of South Station) is expected to cost $2 million.

• **Port of Boston**—During 1956, Massachusetts continued work on what promises to become a $90 million rehabilitation program for the Port of Boston. A $2 million expansion of Castle Island Terminal was almost completed at the year's end, and a comprehensive modernization of the 1,200 long, two story Commonwealth Pier #5 was well under way. The $75 million Boston Army Base, soon to be turned over to the Port Commission, is getting an $11 million rehabilitation.

• **Connecticut Turnpike**—The 129 mile $445 million stretch of limited access road that will traverse Connecticut from Rhode Island to the New York State line, is supposed to be completed by Dec. 31, of this year. However, slow steel deliveries which have delayed completion of the Byram River Bridge will prevent a direct connection with the New York State Thruway until October 1958. On Jan 1, all sections of the highway were under contract except one between Saybrook River and Flanders. Here a short length of existing US #1 will be incorporated in the system. Rte. #1 needs widening but until financial arrangements are worked out with the Federal Government, no work can be done. The remainder of the turnpike is 50% complete from the New York line to the Connecticut River, and 20% finished from there to the eastern terminus. Recently revealed plans for continuous lighting of the pike from Greenwich to New Haven represents a new trend in highway planning.

• **Texas Tower**—Second of the five off-shore radar warning stations planned for the U.S. east coast picked itself out of the waters of the Atlantic on August 13.—almost exactly a year after the first tower was erected on Georges Bank. The newer tower has been anchored in 80 ft of water over Nantucket Shoals 48 miles south of Nantucket Island and 116 mi east of Montauk Point on Long Island.

• **New York State Thruway**—Final section of the main thruway—three miles from Yonkers to the Major Deegan Expressway at the New York City line—was opened on Aug. 31, 1956. With completion of this section it became possible to drive, without stopping, the 427 miles between New York City and Buffalo. An additional 135 miles of feeder and connecting links now under contract will bring the total system to 562 miles of highway. These new sections are:

Berkshire Thruway—a 24 mile, $53 million link between the main thruway at Selkirk and the Massachusetts Turnpike has all but

THIRD TUBE of the Port of New York Authority's Lincoln Tunnel will be open this spring, and will ease congestion of New York-New Jersey Interstate Traffic.

eight miles under construction and will be finished in 1958.

Niagara Section—Running from the Thruway near Buffalo to Niagara, this 23 mile section is half under contract and slated for a 1959 completion. Costing $72 million, the road is largely elevated since it cuts through Buffalo and across Grand Isle.

Erie Section—More than 70% complete, this 70 mile road will connect the Thruway at Buffalo with the Pennsylvania border. All parts of the $85 million road are now under construction and will be entirely finished by the end of the year. However, individual sections will be opened as completed.

New England Thruway—This 15 mile $70 million stretch of road will be opened in 1958 to connect the main thruway with the Connecticut Turnpike.

Rockland County Section—To be ready for traffic this summer, three miles of connecting road will join the Garden State Parkway with the thruway in the Spring Valley area.

• **Kingston-Rhinecliff Bridge** — Although plagued by a severe winter, slow steel shipments, a fatal accident, and other bad breaks, this $19.3 million Hudson River crossing will be opened in February, only three months behind schedule. The structure is 7,793 ft long and uses continuous trusses over the river and plate girder spans on the approaches. Only the electrical work, the painting and the placement of emergency walks is unfinished. Its 14 miles of approach road are complete except for guard rails.

• **New York City Expressways**—Now under construction within the city limits is more than 50 million worth of work. Of this, approximately $10 million is allocated to the $111 million **Cross Bronx Expressway** which will carry traffic east from the George Washington Bridge, and $18 million is being spent on the **Horace Harding Expressway**, a section of the $240 million Long Island Thruway. The $20.4 million **Harlem River Drive**—a Triboro Bridge connecting link—is 50% complete but considerably behind schedule because of slow steel shipments.

• **Port of New York Authority Projects**

Lincoln Tunnel Third Tube—The $100 million, mile-long under-river tube was "holed through" in June, and at the close of the year, was 90% complete. Its opening this spring will double the peak load capacity of the facility in either direction, since traffic in the center tube will be reversed as required by vehicular volume.

Lincoln Tunnel Expressway—Designed to alleviate congestion at the Manhattan end of the tunnel, this $10 million, four lane system will be opened in February. Its eight-block length will facilitate traffic dispersal and collection at city streets.

Brooklyn Piers—As part of an $85 million rehabilitation of the Brooklyn waterfront, the authority has begun work on a 2,000 ft quay type pier (#11) which will be in use by 1958. Plans have been finished for construction of two additional piers, and demolition of many antiquated pier structures (some predating the Civil War) is well under way.

Hoboken Piers—An $18 million pier facility for the American Export Lines was completed during 1956. It consists of two new single deck cargo piers and a rehabilitated double deck pier that is designed to handle both cargoes and passengers.

Port Newark—Almost ready for use at the end of 1956 was the $10 million four berth installation built for the Norton-Lily Company. Also under construction is a three berth, $6 million terminal in the army base area of the port.

George Washington Bridge—An allocation of $10 million has been made for the purpose of covering the engineering costs that will be involved in the proposed double-decking of the structure.

• **Garden State Parkway**—The last, and probably most important section of the $313 million road—a 9½ mile extension running from present parkway terminus to the New York State line—is slated for completion in July. When connected with a now-under-construction 2½ mile spur of the New York State Thruway, the northern parkway extension will provide to automobile traffic between New England and the South and West, the first and only high-speed bypass of New York City. The $17 million extension is a four lane blacktop with center islands ranging from 40 ft to 200 ft wide, and it includes 18 bridges, all of prestressed concrete. At the first of the year, it was 50% complete.

• **New Jersey Turnpike**—All construction work on the pike was completed during 1956. The widening from four to six lanes of the northern end was completed in time for the Decoration Day traffic. The 8.2 mile Hudson County extension—a direct connection between the road at Newark and with the Holland Tunnel—was completed in two stages. The section from Newark to Bayonne was put in use on April 4, and by September 15, the road was open to the tunnel. This $120 million section of the turnpike includes a 9650 ft long, six lane high level bridge across Newark Bay, and cuts through one of the most congested areas in the state. The Edgly spur, a six lane, six mile long road built to connect the New Jersey and Pennsylvania Turnpikes, was completed in early spring. Running from Bordentown, N. J. to the Edgly Bridge, the link cost $15 million.

• **Edgly Bridge**—Built and owned jointly by the New Jersey and Pennsylvania Turnpike Authorities this $20 million high level structure crosses the Delaware to conect the main arteries of the two states. It was opened May 25.

• **Camden Drydock**—In late October, 1955, New York Ship contracted with the U. S. Navy to build an aircraft carrier for the Forrestall Class—with the stipulation that the keel would be laid before December 31, 1956. Having no graving dock large enough, the ship company had to get one built—and the Camden Drydock is it. Approximately 1,100 ft long, 150 ft wide and 43 ft deep, the dock was far enough advanced on December 27 to permit the keel laying—just four days ahead of the deadline.

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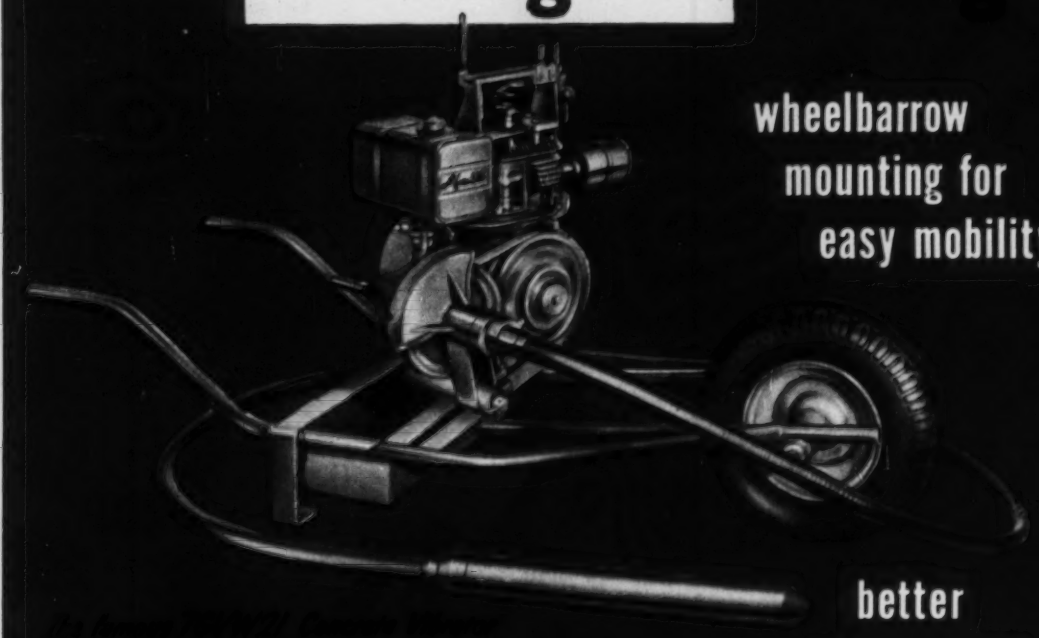

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LONG ACCESS ROADS, ample parking space, and a natural setting characterize toll-road service areas such as this one shown under construction on the Florida Pike.

Construction of the $10 million installation involved the longest continuous concreting operation on record. In six weeks, 60,000 cu yd of grout was injected into preplaced aggregate to produce 140,000 cu yd concrete. Although the dock will not be completely finished until mid-year, construction of the carrier is well under way.

• **Walt Whitman Bridge**—This structure, spanning the Delaware River between Philadelphia and Gloucester, N. J. will be open for traffic in early spring. The main span is finished except for electrical work. The administration building and the toll booths are nearing completion, and although behind schedule, the approach roads will be ready when needed. Actual cost of the long bridge (6.5 miles with approaches) is going to be less than the $90 million estimated cost.

• **Port of Philadelphia**—Because a survey of 178 piers on the Delaware and Schuykill Rivers shows 36 to be unusable and 50 to be unsuitable for today's ocean-going vessels, the nation's second port has started on a $50 million ship terminal rehabilitation program.

• **Pennsylvania Turnpike**—The North-East extension of the Pennsylvania Turnpike system—designed to connect the grandfather of modern highways with the New York State Thruway—is scheduled for a March or April completion. Running from Plymouth Meeting to Clark's Summit the 110 mile four lane concrete road is 80% complete. Its 133 bridges involve 12 stream crossings and three major river crossings, longest of which is the 1500 ft Lehigh Bridge at Tarryville. Highest bridge in the highway is a 738 ft long structure which clears Mud Run by 195 ft. Its one tunnel, a 4,300 ft bore through Blue Mountain, will be the determining factor in the opening date of the road. In construction costs, Pennsylvania has an all too rare condition—it now appears that the estimated $196 million cost will be pared by $25 million.

• **Baltimore Tunnel**—right on schedule, this 6,300 ft artery beneath the Patapsco River will be carrying traffic by December of this year. As of January 1 the tube was about 60% complete with 13 of its 21 sections in place under the riverbed. Each section consists of two 300 ft long, 32 ft diameter concrete covered steel cylinders joined side by side and floated into position over a previously dredged cut in the river bottom. When positioned, the sections are sunk by ballasting to depths as great as 101 ft below the surface. Some 14 miles of access roads are under construction and will be ready for the tunnel opening.

• **Hampton Roads Bridge and Tunnel**—This 3.5 mile crossing of the lower Chesapeake is well on its way to completion and its builders are still shooting for the initially planned opening date of Nov. 1. All 23 tube sections of the 7,000 ft tunnel are in place and are being opened successively for interior work. Unless unanticipated trouble develops, all bulkheads will be out by March 23. So far, the removal of bulkheads in eight sections has turned up only one wet joint—and that an easy one to correct. The 7,000 ft southern approach trestle is decked as is the 3,000 ft northern trestle. Completion of the southern portal has been delayed some by the installation of hurricane protection but the north portal is finished. Construction on the approach roads is now behind schedule but is not expected to delay the tunnel opening.

• **Florida Turnpike**—Actual road work on the 110 mile, $75 million "Bob-tail Turnpike was completed well before the end of 1956, but there was still a considerable amount of clean-up and landscaping yet to be done. With typical Florida showmanship, the Turnpike Authority postponed official opening of the road until January 25 of this year—at which time the highway was deemed attractive enough for its principal users—out-of-state tourists. Running from Miami to Ft. Pierce, the Bob-tail pike is the first section of a limited access road that will eventually stretch the full length of the state.

• **Chicago Metropolitan Area**—Both toll roads and expressways held the construction spotlight in the Windy City and surrounding area last year. And the tempo of this work will be stepped up during 1957. **Congress Street Expressway**, the 8-mile artery in Chicago's comprehensive superhighway system, was formally opened to traffic last August between Michigan Ave. and Laramie Ave., a distance of about 6 miles. Construction of the remaining 2 miles to the city limits will be finished late this year or early in 1958. Estimated cost of the 8-lane divided expressway is $105 million. Chicago's Department of Public Works' **Superhighway Program** for 1957 includes the awarding of $33 million worth of construction contracts and the purchase of about $10 million of right-of-way.

The department awarded a total of 35 contracts costing about $55 million last year for its **Calumet Skyway Toll Bridge Project.** Remaining construction contracts will be awarded this year, with the $88-million 7.6-mile project scheduled for completion in March 1958. It will extend from a connection with the Indiana East-West toll road at the Illinois-Indiana state line near 106th and Indianapolis Blvd. to State St. at about 63rd St., on Chicago's south side.

• **Illinois Roads**—At the end of 1956 the Illinois Toll Highway Commission had either contracted or advertised for bids on construction of 74 miles, or 38%, of the 193-mile **Illinois Tollway System.** Eight construction and supply contracts totaling $18 million were available last year. All construction contracts are scheduled to be awarded by June of this year, and target date for opening the entire $415 million project is Dec. 31, 1958. A 6.2 mile section of North Illinois toll route—from near O'Hare Airfield to a connection with the Northwest Expressway—will be built by Cook County as a free expressway at a total cost of about $40 million.

• **Detroit Expressways**—By the end of this year the Michigan State Highway Department and the Wayne County Road Commission expect to have all remaining construction under contract on the 9.5 mile north-south **John C. Lodge** and the 14-mile east-west **Edsel Ford** expressways. Both expressways will be completed in 1958. At present, 7.8 miles of the Lodge and 7 miles of the Ford expressways are carrying traffic, totaling 115,000 to 120,000 vehicles per

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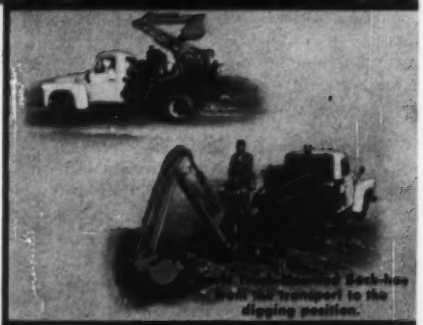

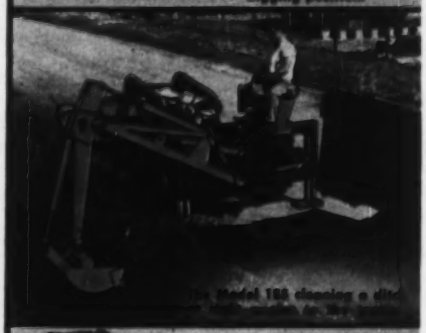

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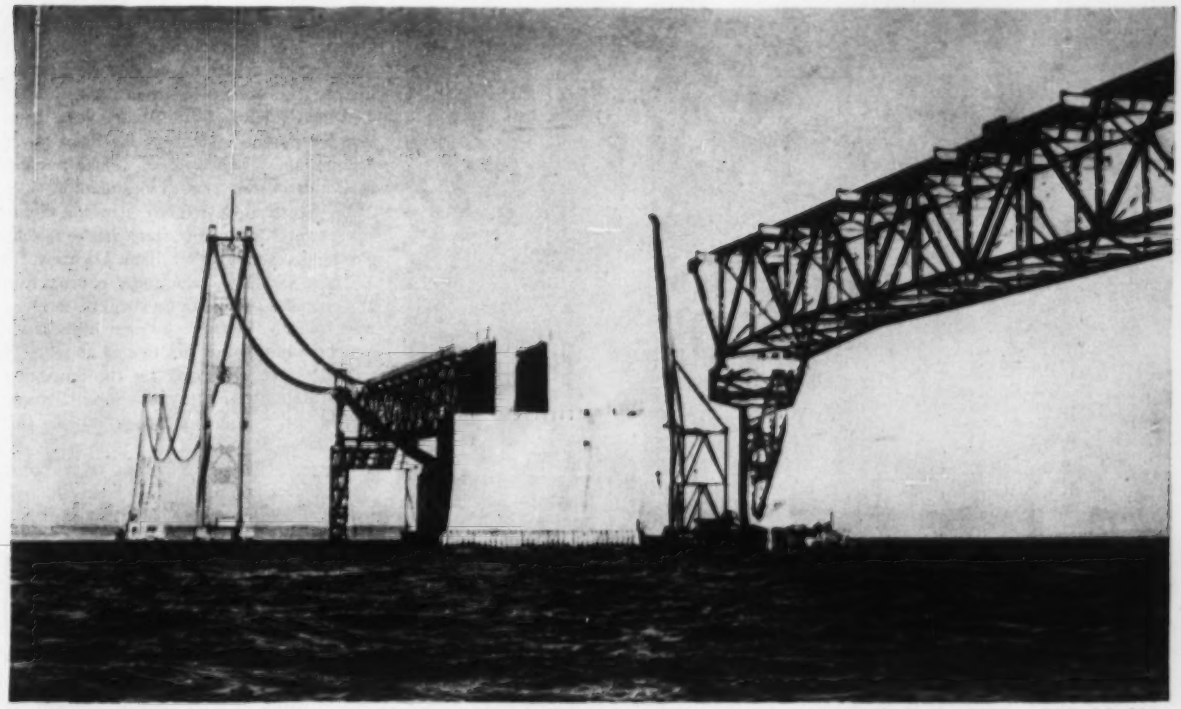

RIGHT ON SCHEDULE, with its main cables in place and all but two of its approach spans finished, the $100 million Mackinac Straits Bridge will be carrying traffic late this year between Michigan's upper and lower peninsulars.

day. Last year 11 grade separations were completed at a total cost of $2.1 million, and 2.7 miles of expressway were completed on the two projects. A total of 18 road and grade separation contracts were awarded last year totaling $10.5 million, $6 million of construction was completed, and $7.3-million of right-of-way was purchased, on the two expressways. This year, about $14 million worth of contracts will be awarded on the Ford expressway and $4 million on the Lodge expressway. The shortage of structural steel last year greatly hampered progress of structures on the expressways. As a result, steel is being purchased several months in advance of awarding contracts.

• **Ohio's Booming Program**—The fast tempo of freeway and expressway construction set last year by the Ohio Department of Highways won't slacken this year. During the first half of 1957 contracts will be awarded for the construction of 18 urban freeway and rural expressway projects, totaling 77 miles. Total cost including right-of-way and engineering is $74 million. During 1956 the highway department awarded $25 million worth of freeway and bridge construction contracts in the six urban areas of Columbus, Cleveland, Cincinnati, Akron, Toledo and Dayton, and completed $14 million worth of work. At the end of last year 38 miles of the 69 miles of freeways and expressways in the six cities were either completed or under construction. Last year the Ohio Highway Department also awarded contracts for 87 miles of rural expressways in 18 counties at a total cost of $55 million.

• **Mackinac Straits Bridge**—After three years of construction, progress is right on schedule for work on the $100 million connecting link between Michigan's upper and lower peninsulas. In fact, with 73% of the time allowed for completion of the main contracts for substructure, superstructure, and concrete deck, 75% of the the work has been completed. The year 1956 saw the finish of all substructure work except that in the anchorage piers, which will be done as the dead load is suspended from the cables. Spinning of the 25,160 individaul wires that make up the main cables, was completed in 78 days, and much of the cable banding is done. In spite of the July steel strike, 26 of bridge's 28 approach trusses are in place, and for the most part, decked. Field riveting operations on the main towers and backstay spans are also finished. The bridge is scheduled for a November 1957 opening.

• **Cleveland Railroad Bridges**—Three additional new bridges over the Cuyahoga River in Cleveland, Ohio, will be placed in operation this year under an $18 million bridge replacement program being executed under a joint agreement between the Corps of Engineers and four railroad companies. The three new bridges had reached the following percentages of completion at the end of last year: NYC and PRR, 85%; B&O, 95%; and NYC & St.L., 77%.

• **Oklahoma Turnpike**—Both construction time and construction money are being saved on the Oklahoma Turnpike Authority's Northeastern Turnpike. The 88.5-mile toll road from Tulsa to Oklahoma-Missouri border near Joplin should be opened to traffic at least a month ahead of the original target date of July 1, 1957. And the total construction contracts will underrun the estimated $50 mililon cost of construction by $1.4 million. This will leave intact the original contingency reserve fund of $6.5 million. All 96 construction contracts have been awarded. The 22 grading contracts are finished and all but one of the 90 bridge and grade separations have been completed. Three of the 21 paving contracts are completed and the others are well advanced. All three concession areas at Claremore, Vinita and Miami, Oklahoma are under construction, as are the toll plazas.

• **Dallas-Fort Worth Turnpike**—All construction contracts have been awarded and the 30-mile toll road is scheduled to be opened from its western terminus in Fort Worth to Hampton Road in Dallas by July 1 of this year—the original target date. Late structural steel deliveries will delay the opening of the remaining 3-mile section in Dallas by about 45 days. Construction costs of the project will total $35.4 million, and right-of-way will cost about $10 million.

• **Pacific Northwest pipeline**—Work was completed in 1956 on a 1,487-mi. pipeline to carry natural gas from the San Juan

STRETCHING 24 MILES across Lake Pontchartrain, this two-lane toll structure, standing on prestressed concrete piles, is a direct link to New Orleans from the north.

Basin of New Mexico to the Pacific Northwest at an estimated cost of 230 million for the Pacific Northwest Pipeline Corp. Distributing companies spent some $10 million during the year on expansion of their systems and work is expected to continue at about the same rate throughout 1957.

• **Alaskan Way Viaduct**—Work was carried out under two contracts totalling $4.8 million for extending Alaskan Way Viaduct in Seattle nearly a mile to the south. Both will be finished in 1957. But traffic won't use the new facilities until completion of a third contract—expected to be awarded in the spring—for a ground-level approach to the viaduct.

• **Duwamish River Bridge**—In Seattle, work was completed on a $6.5 million bridge across the Duwamish River at First Ave. S., with unique floating piers and a double-bascule steel span. The new bridge has been opened to traffic, relieving a traffic bottleneck created by a narrow, old bridge.

• **Spokane Freeway**—Construction will continue in 1957 on the second half of a $7 million, 11.8-mi. freeway extending eastward from Spokane to bypass populated suburban areas along U. S. 10. During 1956 expenditures of $2 million were made with the first five miles opened to public use in 1956. Removal of condemned homes both in and out of the city limits for the freeway and one-way approaches was nearly completed in 1956.

The state submitted to the city preliminary plans for a north-south $13 million freeway to connect with the east-west freeway under construction. The north-south limited access freeway will bypass urban residential and commercial areas and includes a new 500-ft concrete bridge over the Spokane River.

• **R. H. Baldock Freeway**—Oregon's $11 million Portland to Salem freeway section of U. S. 99 East was opened to four-lane traffic its full length in August and renamed the R. H. Baldock freeway, in honor of a man, recently retired, who was Oregon's highway engineer for 24 years.

• **New Orleans Area**—A multipronged attack on the transportation problems in the Metropolitan New Orleans area is reaping results. The 24-mile **Lake Pontchartrain Toll Bridge**—a major artery in the $200 million Greater New Orleans Expressway system—was opened to traffic on Aug. 30 last year. The $46 million project earned $400,000 in toll collections during the first four months of operation. These revenues are expected to be increased with the completion this year of feeder routes and connecting links at each end of the toll bridge. A second bridge in the New Orleans area—the four-lane cantilever—**Mississippi River Toll Bridge**—is expected to be opened to traffic in March, 1958. Nine major contracts totaling $35 million have been awarded, with six remaining to be awarded, at a total cost of about $3.2 million. The four main piers are completed and erection of the 850-ft and 590-ft anchor arms are under way. The 1,575-ft central span will be erected this summer.

The 2.3 mile toll bridge is being built by the Mississippi River Bridge Authority under a $65 million bond issue. It is the key structure in the New Orleans urban expressway developmnt plan. On the New Orleans side of the river it will connect with the Pontchartrain Expressway leading to the Lake Pontchartrain toll bridge. Contracts totaling $12.5 million have been awarded on this expressway link, and about $12 million of construction will be put under contract this year. On the other side of the Mississippi River, the new toll bridge will connect with the State Highway Department's 9-mile **West Bank Highway.** A 4.5 mile section is now under construction at a cost of $2 million. Bids will be received next month (March) for an interchange structure and approaches to cost about $3.4 million. And a contract for the remaining 4.5 mile length of the West Bank Highway is expected to be awarded in July of this year. Estimated cost is $2.3 million.

Contracts are expected to be awarded this year for construction of the $100 million **Acadian Thruway.** The proposed toll project will connect Lutcher, La., located on U. S. Highway 61 about 35 miles west of New Orleans, and Lafayette, La. on U. S. Highway 90. The 68-mile straight line route will cut about 50 miles off the present route between New Orleans and Lafayette. In May of last year a $32 million contract was conditionally awarded for superstructure construction of six major bridges on the Thruway. Bids for the remainder of the 68-mile project were to be received early this year (Jan. 16). The awarding of all contracts, however, are subject to the sale and delivery of revenue bonds.

• **Banfield Freeway**—Linking U. S. 30 in Oregon's Columbia River gorge with downtown Portland via a water grade gulch route, this freeway in 1956 had reached within two miles of midtown. Grading was complete on final portion of 14-mile route; paving will be undertaken in 1957 when the $17 million project is to be completed.

• **Williamette River Bridge**—The $12 million Morrison Street span over Willamette River in Portland, Ore., advanced on schedule (26% at year's end) with end piers complete and mid-stream piers of the double-leaf bascule span, nearly finished. Due to carry traffic in early 1958, the work also includes approach structures costing almost $5 million for Morrison and the adjacent Hawthorne Street bridge.

• **Interstate Bridge**—Pier work on the $14 million Columbia River Interstate bridge between Portland, Ore., and Vancouver, Wash. (U. S. 99) got under way late in 1956. The structure parallels an existing span opened to traffic in 1917. Completion is scheduled for 1960.

• **U. S. 40**—California is continuing a program of converting to full freeway standards the 211 miles of U. S. 40 between San Francisco and the Nevada state line. So far 91 miles have been completed—

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FOUR MILE LONG Richmond-San Rafael Bridge over San Francisco Bay is composed of 36 girder spans (100 ft ea), 36 truss spans (289 ft ea), and two 1,070 ft cantilevers.

mostly between San Francisco and Sacramento. Currently under construction are 32 miles and the 1957 budget includes funds for another 11 miles. Work has been under way for 10 years but will be accelerated now since U. S. 40 in California is on the interstate system. Biggest current phase in the Carquinez Bridge and its approaches.

• **Carquinez Bridge**—Construction is more than 25% complete on $31 million of contracts for a parallel Carquinez Bridge and new approaches. Located on U. S. 40 across Carquinez Straits northeast of San Francisco, the project is financed by toll-supported revenue bonds. The bridge parallels an existing structure completed in 1927; both bridges have two 1,100-ft cantilever spans, two 500-ft side spans and a 150-ft mid-crossing tower. Nearly half complete is a $5.4 million substructure contract that features three 53 by 103 ft open floating caissons that are sunk to firm foundation by using hydraulic jets to loosen and air-lifts to remove the underlying mud and sand. Also almost half done is a $7 million south freeway approach contract that features a single 9,700,000-cu yd cut. Other contracts include the 3% complete superstructure, the 38% complete Crockett interchange, the 35% complete north freeway, the 5% complete administration office and a contract just awarded for toll collection facilities. Completion of all these jobs is called for by October, 1958.

• **Martinez-Benicia Bridge**—Bids will be called in 1957 for a 7-mile bridge crossing of Suisun Bay, an arm of San Francisco Bay. Bonds totalling 26 million have been authorized. The debt will be serviced by tolls with revenues from the Carquinez crossing some 6 miles west also pledged for debt service.

• **Richmond-San Rafael Bridge**—Upper deck of this $68 million crossing of north arm of San Francisco Bay was opened to traffic Sept. 1. Traffic was shifted to lower deck in January to permit erection of a new approach trestle on upper level, and both decks will be in use by next September. The bridge is 4 mi long, combines cantilever structures, truss spans and girder spans. Each deck accommodates three traffic lanes.

• **Embarcadero Skyway**—This elevated highway, part of San Francisco's perimeter skyway plan, skirts the city's Bayfront boundary. The skyway is supported by double-level concrete structures, and it varies in width from 4 to 8 lanes. Two projects totalling $7.6 million got under way in March and will be finished by Summer of 1957. A third $7.8 million project, started in November and slated for completion by fall of 1959, takes the skyway post San Francisco's famed ferry building.

• **Bayshore Freeway**—Final link in the 25-mi San Francisco–Redwood City segment of this freeway is under construction, and slated for completion by July, 1957. This last segment is the $8 million "open water project," a 4.2-mi stretch of highway which shortcuts the shore route by going across part of San Francisco Bay, near the San Francisco County line. More than 5 million cu yd of fill has been placed and paving is under way. Three projects under way farther south will complete the Redwood City-Palo Alto segment by the fal. of 1957. The freeway, which links San Francisco and San Jose, is six lanes and eight lanes.

• **Eastshore Freeway**—Only two contracts are still to be let on this 56-mi freeway linking Richmond, Calif., with San Jose, and passing through Oakland—California's third biggest city. Six projects totalling $27 million and adding 15 mi to the freeway were under construction in 1956. These projects, along with the two segments not yet put out for bids, will complete the freeway, which is 8-lane north of Oakland (U. S. 40) and 4-6 lane to the south (Sign Route 17.) Completion is scheduled for 1958.

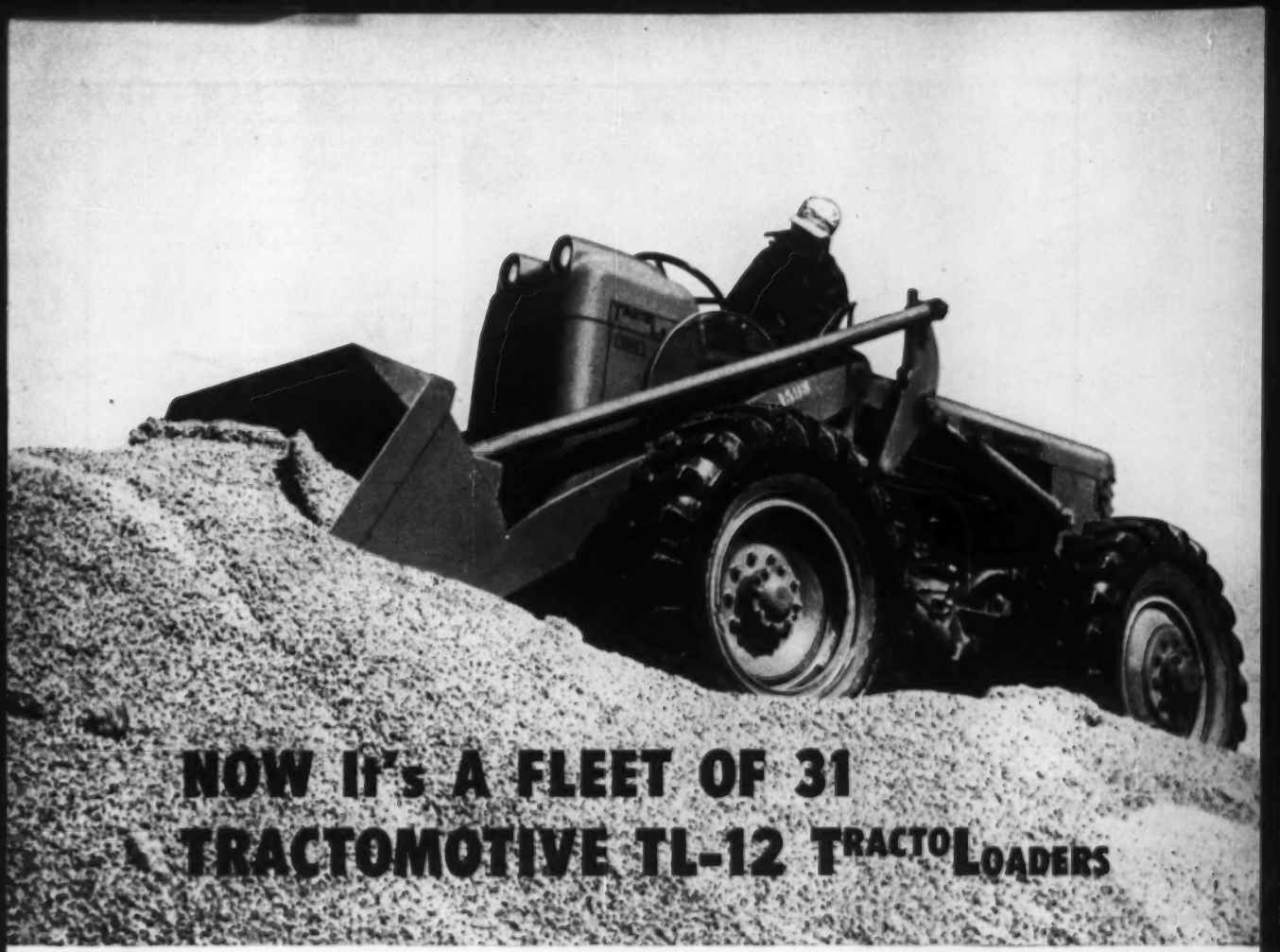
• **PG&E Pipelines**—Pacific Gas & Electric Co. has been working since last summer on a $10 million looping project which will increase the capacity of it's Super Inch Pipeline. The work, 75% complete, will add 85 miles of looping to the pipeline which carries natural gas to San Jose from the Arizona border, 500 miles away.

A 5.25 million line, which will deliver natural gas to Sacramento from a producing field 83 miles away, is 15% complete.

• **Los Angeles Freeways**—Over 20 mi of full freeway was completed in the Los Angeles area in 1956, bringing its freeway network to a total of nearly 100 mi.

In the southern part of the city 4.2 additional miles of the **Harbor Freeway** was placed in operation in 1956, at a cost of $8 million, and to the southeast, an additional mile, costing $2.6 million, of **Long Beach Freeway** was finished, including an interchange with the Santa Ana Freeway. To

INTERCHANGE on Santa Ana Freeway is maze of roads and bridges.



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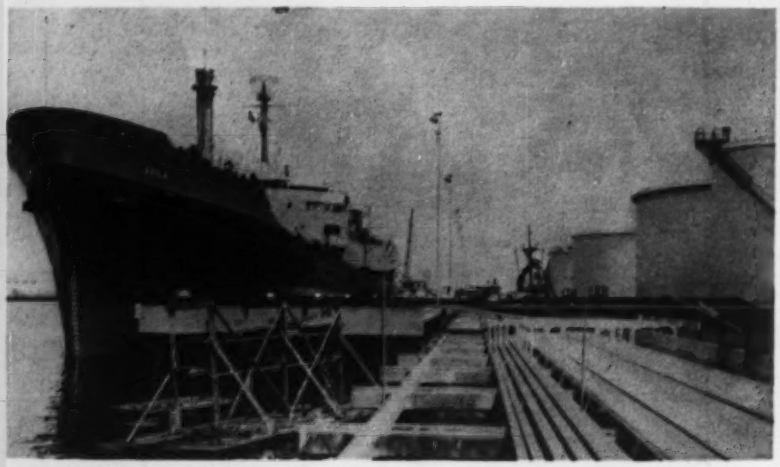

LOS ANGELES' marine oil dock simultaneously accommodates two tankers and several barges. Pumps handle 35,000 barrels an hour, tanks hold 800,000 barrels.

the East, over 12 mi of **San Bernardino Freeway**, worth $13 million, was added, including a vital link through the city of El Monte. In Ventura County, to the northwest, the first 4 mi, $2 million section of the **Ojai Freeway** was opened to traffic.

Going into 1957, some $81 million worth of projects were already in progress, and a number of major items were scheduled to get underway before the year's end. Included among them is the first $8.4 million contract for the new **Olympic Freeway**, planned to eventually reach the 16.6 mile distance from its junction with the Santa Anna Freeway east of downtown Los Angeles to the beach city of Santa Monica. Also to be started, early in 1957, is the first $3.3 million, 1.6-mi section of the much smaller **Glendale Freeway**.

• **U. S. 99**—Construction to freeway standards of the 360 miles of U. S. 99 between Los Angeles and Sacramento has advanced to the point where roads in nearly all the rural areas have been converted to freeway or expressway standards. Main bottlenecks yet to be put under construction are bypasses of the San Joaquin Valley towns Merced, Modesto, Turlock and Lodi. And freeway approaches to the terminal cities are either yet to be constructed or only partly completed. Biggest intermediate city —Fresno—will have a freeway completed through it in 1957.

• **San Diego port facility**—The $9.5 million 10th Ave. terminal, begun in 1955 after a general obligation bond was passed, will be in partial use around Sept., 1957 when half of the pier is completed. Full completion is expected by March, 1958. The terminal will be 2,600 ft long and will accommodate 7 to 9 ships.

• **Salt Lake railroad fill**—Southern Pacific started in 1956 a 13-mile, $49 million fill across the north end of Utah's Great Salt Lake that will replace a nearby timber trestle. More than 31,000,000 cu yd of rock and gravel will be dumped into a trench prepared by dredging some 15,000,000 cu yd of soft material from the lake bottom. Much of the fill will be placed by barges that carry 3,000 tons of rock per trip. The work is expected to take until 1960 to complete.

• **The Port of Long Beach** spent $8.7 million in 1956 for expansion and improvement of the Long Beach Harbor. Approximately $2 million of this is in projects which were carried over to 1957. The Port completed a $1.5 million transit shed of the clear-span type, and construction of a second twin shed was 90% completed. About $2 million was spent to combat Long Beach's special problem of land subsidence. A 1.1 million wharf structure now under way is expected to be finished early in 1957. Originally figured for construction in 1955, at a cost of $6.8 million each, they will now cost the Port $8 million each.

• **The Port of Los Angeles** had underway, or awarded, the final projects financed by its $35 million expansion program, begun shortly after WW II. One of the major items finished in 1956 was the $2.2 million marine oil loading dock for Union Oil Co. A program to widen all 120 ft transit sheds has been started and around $5 million worth of work was completed during the year.

Hawaiian Projects

• **Hilo Highway**—A 40.0-mile, $15.1 million Hamakua Coast highway project is gradually moving to completion. At year's end, the completed portion totalled 32.8 miles and $12.3 million. Under construction was 0.7 mile costing $469,000. Only definite project for 1957 is a 1.3-mile section at $685,000 but a $50 million territorial highway bond issue may result in speeding of this as well as other Hawaii highway projects.

• **Honolulu Freeway**—Biggest project now under way in Hawaii is a $40.1 million Mauka Arterial through Honolulu, which will carry cross-town traffic along a 9.7-mile route through the city. At the end of 1956, a 1.6-mile segment costing $7 million was complete and in use with another half mile, $719,000 section under construction. Programmed for 1957 is a 1.5-mile segment costing $8.2 million (including rights-of-way).

• **Oahu Highway**—The new Nuuanu Pali highway route, improving and replacing 8.3 miles of highway at a cost of $14.5 million is scheduled to advance rapidly in 1957 now that a seven-year right-of-way fight has been settled out of court. Only 2.7 miles, costing $1.8 million was completed at year's end with another 1.6 miles costing $3.4 million under construction. But four more miles, costing $9.4 million will be put out for a bid in 1957. Only projects left for future completion will be two traffic tunnels, one 1,000 ft and the other 500 ft. They will parallel similar tunnels now being completed. The Nuuanu route provides a modern divided highway, over the steep Pali cliff dividing Honolulu from its Windward Oahu suburbs and replaces a winding, narrow highway that is basically one cut across the hills in the 1890's.

• **Honolulu tunnel**—Progress still is slow at the trouble-plagued Kalihi Valley tunnel route, which will open up an entirely new highway routing between Honolulu and Windward Oahu. Work virtually stopped in 1954 when a cave-in 2,000 ft into a 2,773 ft tunnel killed five men. One drift now reaches entirely through the Koolau Mountain range but workmen and contractors are probing through the soft, disturbed earth with utmost caution and now estimate completion will be delayed to March 1958. The tunnel work is a City-County of Honolulu undertaking. More than $6 million has been obligated for the tunnel and 6 million more is set up for a second, parallel bore.

Meanwhile, the Territorial Government, with Federal Aid, is building 6.9 miles of approach highway on both sides of the tunnel at a total cost of $4.8 million and expects to have all work under contract this year. Nothing was complete, but 2.7 miles costing $2.9 million were under construction at the end of 1956. To be put out to bid in 1957 are 4.2 miles costing $1.9 million. This does not include rights-of-way which are being acquired by the City-County.

• **Kahuli Harbor**, on the island of Maui, is scene of major port activity, as contractors attempt to replace sea-damaged breakwaters with heavy (30-ton) concrete tetrapods.

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Housing in 1956 kept up the pace-setting annual rate of one million or more starts of the previous seven years. Among the large projects started last year was the 2,000 unit Douglass Houses, of the New York City Housing Authority, shown above.

Many Records Topple as Building Boom

It was the best year on record for the building industry. In fact, 1956 was so good that 1957 will have a hard time matching it.

Contracts awarded for building construction last year, as reported by ENR, totaled $15.1 billion. This was 20% greater than the previous high, reached in 1955, and nearly 40% greater than the third highest, noted in 1952.

And while the industry sped through 1956 in high gear, it also managed to set a few more records—for longer spans, more floor area unobstructed by columns, and greater height with newer types of construction.

• **Industrial building sets record**—Industrial building was the star performer in 1956. Contracts for private work totaled more than $5.3 billion—81% above the previous year and 29% more than the previous record, set in 1951 during the Korean War expansion. And even if public industrial building also is included, 1956 still broke all records, with contracts awarded totaling $5.5 billion. The previous high of $4.8 billion was set in 1952, when the Atomic Energy Commission program went into high gear.

Sparking the 1956 boom, the process industries registered a gain of more than 50% over 1955. The $1.8 billion of contracts awarded for new chemical, petroleum, petrochemical and aluminum plants last year topped the previous record, set in 1951, by 23%. Second place went to public utilities, which awarded contracts totaling $1.2 billion, and third place to metal refining and rolling, bolstered by the steel expansion, with just under $1 billion in contracts.

Though these records will be hard to equal, the end of the boom is not yet in sight. Industry is operating too close to 100% of capacity for comfort without being able to keep up with demand. The ENR backlog of proposed industrial building projects continues to grow.

How did the industrial buildings constructed last year compare with those built previously? An ENR survey showed a trend to wider column spacing and greater clear heights. There was a continuing trend toward one-story structures for production and storage areas and toward two stories for factory office buildings. Greater use was made of sprinklers and fire barriers. And more emphasis was placed on better working conditions for employees. (ENR July 5, 1956, p. 38)

• **New high for commercial building**—For the fourth year in a row, the volume of commercial building set a new record. Swept upward by a boom in office buildings, contracts awarded for commercial buildings soared to $2.1 billion, exceeding the 1955 record-breaking total by 24%.

The office-building boom is most spectacular in New York City. There, the amount of space now under construction or for which plans have been filed total 18,000,000 sq ft—more than the existing office space in most U.S. cities.

To attract tenants, the new buildings

. . . But other construction—including commercial and industrial building—soared to new highs, as huge projects, such as the $90 million Terminal City at New York International Airport (above), swelled the total.

Continues

are dressed up with striking facades—all-glass, two-story aluminum panels, stamped stainless steel, bronze and pink-gray glass. They are completely air conditioned, brilliantly illuminated—some all night as well as during the day—and acoustically treated inside. Many are set back from the street to provide space for open-air gardens. Inside are luxurious, artistically decorated lobbies, high-speed automatic elevators that cut waiting and traveling time to a minimum, and plush sanitary fixtures. (ENR Jan. 17, p. 40)

• **Housing at the crossroads**—Housing, too, did well in 1956, though perhaps not as well as many homebuilders would have liked. For the eighth consecutive year, more than one million new units were started. But throughout 1956, spokesmen of the builders issued pessimistic predictions for the near future.

Total starts came to 1.12 million, of which 23,400 were for public housing units. Both total and private starts fell short of 1955—second best year on record—by 16%. (A record 1,396,000 units were started in 1950.) In contrast, public housing units registered a 19% gain over 1955, though the total was well below those recorded in the early Forties and Fifties.

A Bureau of Labor Statistics survey of last year's new houses showed the following significant trends:

Houses are getting bigger and more expensive. Median selling prices have increased from $12,300 in 1954 and $13,700 in 1955 to $14,600 in 1956. An increasing number of houses have three or four bedrooms; those with only one or two are on the decrease. Half of the new houses have basements, 1¼ or more bathrooms and a garage. At least 7% are air-conditioned; 17% have carports; and more than one-third have fireplaces.

Wood-frame construction is used in about 83% of the new houses. Brick, as a facing with this type of construction, is growing in popularity; and for interiors, more houses have dry-wall construction than wet-wall. Nearly 70% of all new houses have furnaces and duct systems for warm-air heating.

In rental units, average floor area per unit has gone up to 660 sq ft, an increase of 40 sq ft over 1955. The number of bedrooms per unit appears to be decreasing. (ENR Nov. 29, 1956, p. 24)

Homebuilders were not pessimistic over their ability to find buyers for these bigger, more expensive homes, but were troubled over the shortage of mortgage money. They considered the shortage serious at the beginning of 1956, but they termed it really critical when the Federal Reserve Banks in August raised the rediscount rate from 2½% to 3% and lenders boosted the prime rate to 4%.

In December, the Federal Housing Administration raised the interest rate on FHA-insured mortgages from 4½% to 5% in an attempt to bolster the sagging house market. Pressure was immediately put on Congress to increase the rate on Veterans Administration mortgages to 5% also.

In recent years, almost half of the houses built have been under FHA or VA financing. In some cities, the proportion is as high as 65% to 75%. So the hope is that the increased interest rates will attract more capital to the housing market.

During the past year, the 200,000-unit drop in starts from the all-time highs has been almost entirely centered in the lower cost homes financed with

ALUMINUM PANELS enclose the welded steel frame of the 24 story Second National Bank building in Houston, Texas.

Trailblazing:

In building exteriors, the accent was on color in 1956. Whether the facades were masonry or metal, the buildings under construction last year showed a definite trend to bright hues.

Brilliant effects were achieved with porcelain-enameled steel. A good example is the RCA Cherry Hill Laboratories at Camden, N. J., designed by Vincent G. Kling, architect, where the exterior spandrels of the administration building are bright-yellow corrugated sheets. They are set in contrasting stainless steel frames, as are the windows.

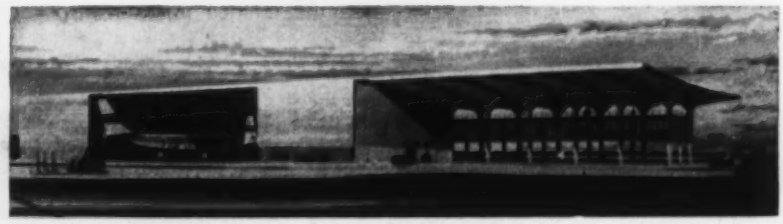
Another colorful structure is the 38-story House of Seagram, in New York City, which now is being enclosed with story-high panels of architectural bronze (copper 56%, zinc 41.5%, lead 2.5%). Mullions extending the full height of the building also are bronze. Window glass will be tinted pinkish gray. The building was designed by Mies van der Rohe and Philip Johnson, with Kahn & Jacobs as associate architects.

Shadow lines create a contrasting effect on the stainless steel panels of the 45-story Socony Mobil Building in New York City. The effect was achieved by stamping the 0.037-in. thick panels with a decorative geometric pattern and giving the metal a 2D sheet finish (ENR

FHA and VA-insured loans. This type of housing was off 30% compared with only a 1% drop in homes financed with conventional mortgages. Chances are that this pattern of homebuilding—that is, tending to the higher priced brackets—will continue in 1957.

In view of the tight money market, Joseph B. Haverstick, president of the National Association of Home Builders found it necessary to warn NAHB members not to assume that the condition is temporary—"because it may well get tighter." Don't start construction or advance very far in project planning without written financing commitments for long-term mortgage needs, he wrote them. Keep production closely related to sales volume.

• **New housing law**—Legislation passed by Congress during 1956 gave a boost to some phases of the housing market. The Housing Act of 1956 extended FHA Title I—home repair and inprovement loan program—for three years, also increasing the mortgage term and loan limits. Insurance authorization under FHA Title II—sales housing and rental programs—was upped by $3 billion. The difference between FHA loan-to-value ratios on new and existing housing was eliminated. Liberalizing changes were made in the FHA rental and urban renewal provisions.



CONCRETE HANGAR under construction for National Airlines in Miami, Fla., will have a folded-plate roof with 110 ft cantilevers.

Under FHA Title VIII—military family housing—the Capehart program, enacted in 1955 to supersede the Wherry Act program, was extended two years. Insurance authorization also was increased.

Operation of the Federal National Mortgage Association was made more flexible under the new law. The amount of FNMA common stock that mortgage sellers must purchase was reduced from a maximum of 3% to 2% of the unpaid principle of the mortgages sold to FNMA, but the agency was given authority to set percentage down to 1%. These provisions enable the agency to provide a degree of liquidity to mortgage sellers by purchasing FHA and VA mortgages in areas where investment funds are scarce and reselling the mortgages in areas where funds are available. Last August, the rate was dropped from 3% to 2% as required by the law, and in September, to 1%. To conserve its dwindling funds, FNMA raised the rate back to 2% at the beginning of this year.

New provisions in the 1956 housing act are intended to assist housing for the elderly. And a total of $2.5 million for the next three years was authorized for an HHFA research program on national housing policies and programs.

(*Continued on page 111*)

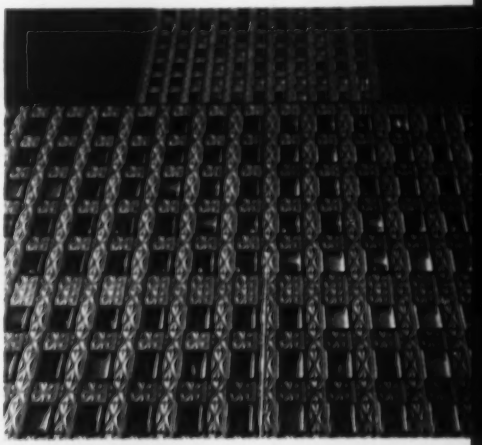
Colorful Buildings of 1956

Feb. 9, p. 33). Harrison & Abramovitz and John B. Peterkin were associated architects.

In Pittsburgh's Golden Triangle, the new 16-story State Office Building was enclosed with royal-blue aluminum panels above a white marble base. The color is part of the anodized finish. Architects were Altenhof & Bown. In New York City, a 34-story office building, designed by Sylvan and Robert L. Bien. architects, is being enclosed in gold-colored aluminum.

A warehouse for A. M. Castle & Co. in Franklin Park, Ill., gets its color from a combination of red brick, green translucent plastic panels and stainless steel siding. The plastic is a glass-fiber reinforced polyester. John Cromelin was the architect.

And as described in ENR May 17, p. 54, General Motors Technical Center featured a new-type, brightly colored brick in combination with gray porcelain-enameled steel panels. The ceramic-glazed, sand-molded shale brick has since become generally available.



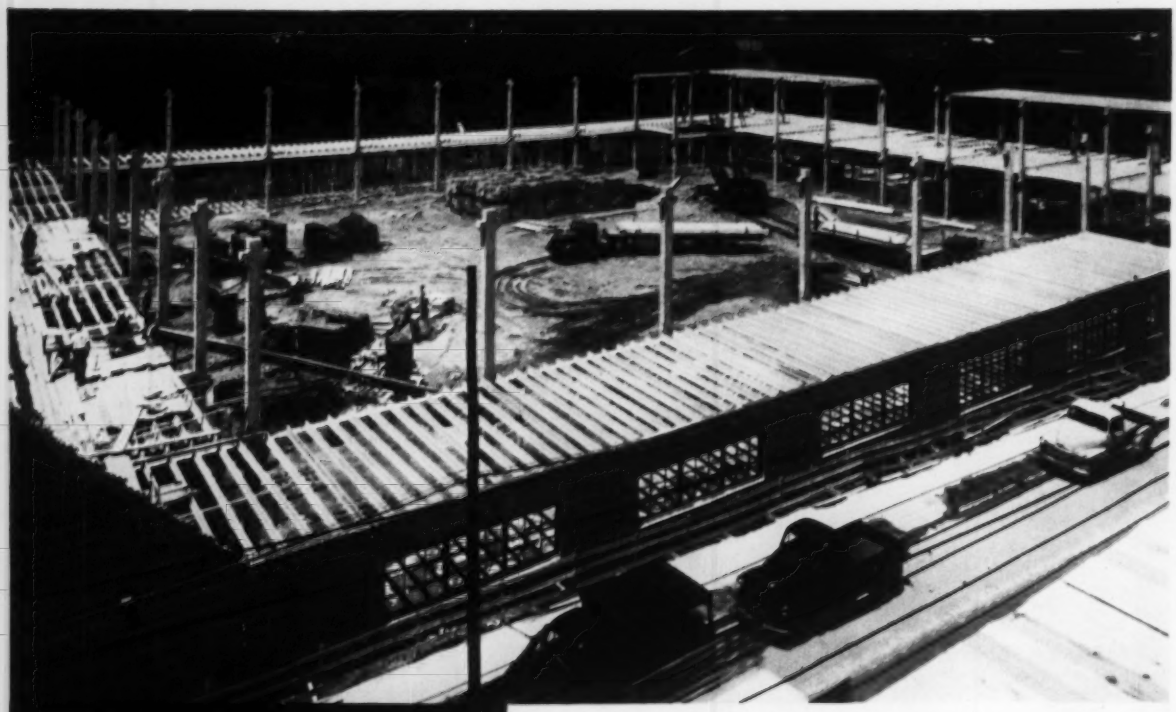
Stainless steel panels stamped in decorative pattern form the facade of the Socony Mobil Building, New York City.

Porcelain-enameled steel in bright colors enclose the RCA Cherry Hill Laboratories at Camden, N. J.

Blue aluminum gives the State Office Building (center) in Pittsburgh a colorful exterior. At the left is one of Gateway Center's stainless steel buildings.

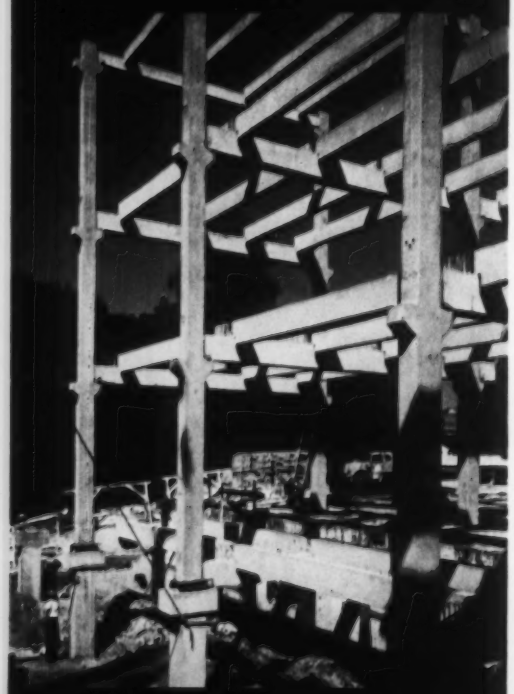
Bronze panels and mullions give the House of Seagram, New York City, a distinctive appearance.

Green plastic panels and red brick contrast sharply with the stainless steel siding of a warehouse in Franklin Park, Ill.



Upper photo. Finishing plant is 196 feet by 296 feet and two stories high.

Lower photo. A portion of the manufacturing plant, 270 feet by 259 feet, which is two, three and four stories high.



Consulting Engineer: WALTER PREIMATS, Asheboro, N. C.
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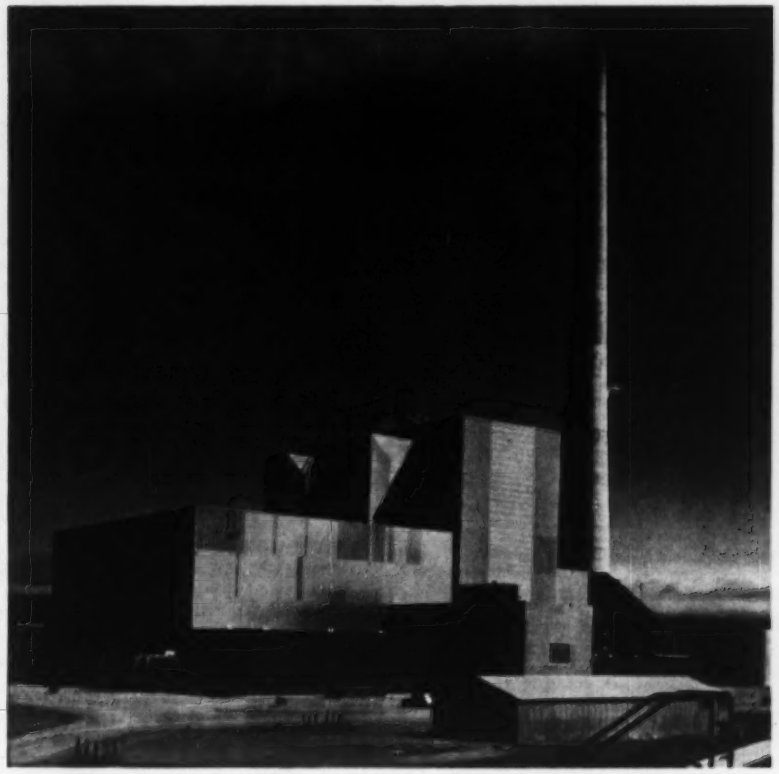

MORRO BAY STEAM PLANT, with 330,000 kw capacity, built for Pacific Gas & Electric Co., near San Luis Obispo, Calif., operates on desalted seawater.

In the last week of Congress, a series of GI bill amendments was passed extending the World War II Home Loan Guaranty Program to July 25, 1958.

• **Gain in public building**–Keeping up with the rest of the industry, public building rekgistered a gain of 22% over 1955. However, the $2.4 billion total was far less than in a number of previous years.

Prospects are that there will be a slight decline in public building this year. The Atomic Energy Commission spending is on the down grade. The school program could not proceed any faster in 1957 even if federal aid was forth coming. And federal building is likely to decrease; for if the lease-purchase program should be successful, the construction would be classified as private building, and if it isn't, the jobs probably will be held up until Congress votes funds for design and construction.

In 1954, Congress passed a law permitting some federal agencies to award lease-purchase contracts for new buildings. This technique, in brief, enables the government to buy its buildings on the installment plan. More than 50 projects, totaling $105 million, were approved by the end of 1955 for the General Services Administration and the Post Office. Throughout most of 1956, the GSA asked for bids separately or in combination for construction and financing with a 4% maximum interest rate. But few tenders were forthcoming on financing.

Toward year's end, GSA revised its rules and required combination bids on the whole package. On six jobs for which bids were taken in December, only one looked good. This year, lease-purchase is still alive– but barely.

• **Construction for atomic energy**–During 1956, the U.S. atomic industry began construction or received contracts for the building of 59 nuclear reactors. Of these 29 were power-type, designed for power demonstration plants for private buyers in this country, prototype or demonstration plants for the AEC and ship propulsion. In addition, work proceeded on previously awarded contracts for 17 reactors of various types. Two reactors were completed–for industrial research by Armour Research Foundation, Chicago, and Battelle Memorial Institute, Columbus, Ohio.

Also, last year, contracts were awarded and plans announced for eight uranium-ore processing mills, a feed materials plant, five nuclear-fuel-element manufacturing plants, seven critical facilities, three zirconium and two beryllium production plants. More than 20 companies completed or planned to build major radiation research centers.

Among the outstanding developments in construction for nuclear power in 1956 were:

The first large-scale, central nuclear power plant in the U.S.–the pressurized water reactor Duquesne Light Co. is constructing at Shippingport, Pa.–was pushed close to completion and will be ready to deliver 60,000 kw of electric power to the Pittsburgh area sometime this year.

Commonwealth Edison Co. received a construction permit for a 180,000-kw plant at Dresden, Ill., near Chicago.

Consolidated Edison Co., New York City, received a construction permit for a 236,000-kw plant near Peekskill, N. Y. In this plant, 140,000 kw will be supplied by a nuclear reactor and 96,000 kw by an oil-fired superheater.

Consumers Public Power District, Columbus, Neb., started development of a 75,000-kw reactor.

Power Reactor Development Co., Detroit, Mich., began construction of a 100,000-kw reactor at Lagoona Beach, near Monroe, Mich.

In addition to these four, for which construction contracts have been awarded, Pennsylvania Power and Light Co. started development of a 150,000-kw plant for construction in eastern Pennsylvania. These projects are estimated to cost about $0.5 billion.

This year, the Army Package Power Reactor will be completed. From a reactor vessel no bigger than an industrial water heater, steam will be generated to turn a conventional 2,500-kw turbogenerator at Ft. Belvoir, Va. The major components of the unit can be transported by plane. (ENR July 12, 1956, p. 45)

A new industry has been created. A new market for construction is wide open.

• **Outlook for schools**–Prospects for increased school construction are still uncertain. Congress has not yet authorized the federal aid that could give added incentive to the states to expand their programs.

Last April, the Committee for the White House Conference on Education submitted its report to President Eisenhower. It included this key policy statement:

"This committee believes that federal aid for school construction should be made available on a limited basis to all states and territories and the District of Columbia to help overcome the present school building emergency. It believes, also, that federal funds should be provided under the philosophy of encouraging greater use of state and local funds . . . that federal aid to

LEVITTOWN, PA., expanded in 1956 to 15,500 houses. It was started in 1952.

all the states can be justified, however, only on a temporary basis to meet an emergency situation such as the present school building emergency."

The President's budget again this year proposed a program of federal aid. Authorization, over a four-year period, of $1.3 billion was asked for matching grants to states for school construction; $750 million for federal purchase of school construction bonds when needy local districts cannot market them at reasonable rates; $20 million in grants for state planning to overcome financial obstacles to school construction; and an unspecified amount for support of bond reserves of state school-financing agencies. The budget for fiscal 1958 proposes a total of $451 million.

Last year, the segregation issue was the principal stumbling block for congressional action on school legislation. The issue has not yet been resolved.

• Hospital construction declines—Following a pickup in 1955 in the federal-aid program for state, local and private non-profit hospitals, construction dropped off considerably last year. Federal grants totaling $210 million a year are authorized under present legislation.

During fiscal 1956, construction was started on only 187 projects, with an estimated cost of $137 million, compared with 396 projects in 1955, with an estimated cost of $332 million.

• Overwhelming demand for steel—The building industry throughout 1956 was plagued by the difficulty of obtaining steel. A committee of the Associated General Contractors of America, Inc., estimated the demand for fabricated structural steel last year was 3.70 million tons, whereas the American Institute of Steel Construction figures production was 3.25 million tons. As a result, the time required for steel deliveries in many cases lengthened to six months or more.

Meanwhile, several steel producers started to increase production of steel sections. For the first six to eight months of this year, the AISC estimates, new orders for fabricated steel will exceed shipments by the mills to fabricators. However, by the third quarter, steel rollings for shipment to fabricators probably will exceed new orders. And some time before 1959, when current mill expansion programs will be completed, fabricated steel production should be capable of keeping pace with the demand.

• Ultimate-strength design—The steel shortage gave added incentive to improvements in structural design, to make the available steel supply go farther. One way that many designers have adopted is to use continuous beams wherever possible. Last spring, results of a ten-year research program at Lehigh University were released that showed that continuous beams could be made even more economical by plastic design—known also as ultimate-strength, ultimate-load or limit-load design.

At present, structural steel is designed mostly by the elastic theory. Yield-point stress is divided by a safety factor to obtain a working stress, and members are proportioned so that this stress is nowhere exceeded. For many types of steel structures, particularly continuous beams and frames, this procedure is wasteful. It ignores the great ductility of steel, which permits redistribution of stress from overburdened to underloaded elements.

In contrast, plastic design provides a means of calculating the actual load-carrying capacity of a frame. When the ultimate load has been computed, a safety factor is applied to it to determine the safe working load. Under that load, stresses will be in the elastic range, just as for structures designed by the elastic theory, but generally will be greater than elastic-theory stresses.

Design by elastic theory often requires heavier sections at the ends of continuous beams than at midspan. Plastic design, however, makes feasible efficient use of constant-section beams in continuous construction. Thus, there may be savings not only in amount of steel needed but also in fabrication.

The plastic theory assumes that when bending creates stresses that exceed the yield point at a section, the beam will rotate under larger moments as if a hinge had formed at that section. A continuous beam will not fail until three hinges occur in a span. Thus, it has considerable reserve strength after the yield stress is reached at one point in the span.

The American Institute of Steel Construction is preparing a guide for the use of this theory. It probably will be available sometime this year.

Ultimate-strength design also was introduced as an accepted procedure in reinforced concrete last year. In updating its building code, the American Concrete Institute approved ultimate-strength design as an alternate to the straight-line elastic theory. However, this plastic theory, at present, is limited only to the reserve strength in a beam cross section; analysis of indeterminate structures is required to be based on the elastic-frame theory.

Ultimate-strength design in the ACI code is based on the following assumptions:

1. Plane sections normal to the axis remain plane after bending.

2. Tensile strength in concrete is neglected in sections subject to bending.

3. At ultimate strength, stresses and strains are not proportional. The diagram of compressive concrete stress distribution may be assumed a rectangle, trapezoid, parabola, or any other shape that results in ultimate strength in reasonable agreement with comprehensive tests.

4. Maximum fiber stress in concrete does not exceed 0.85 f'_c.

5. Stress in tensile and compressive

(*Continued on page* 116)

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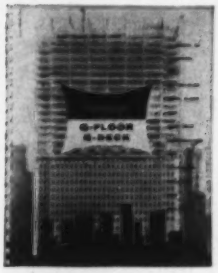

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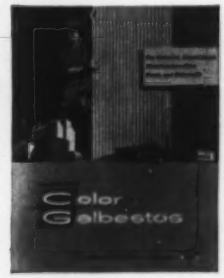

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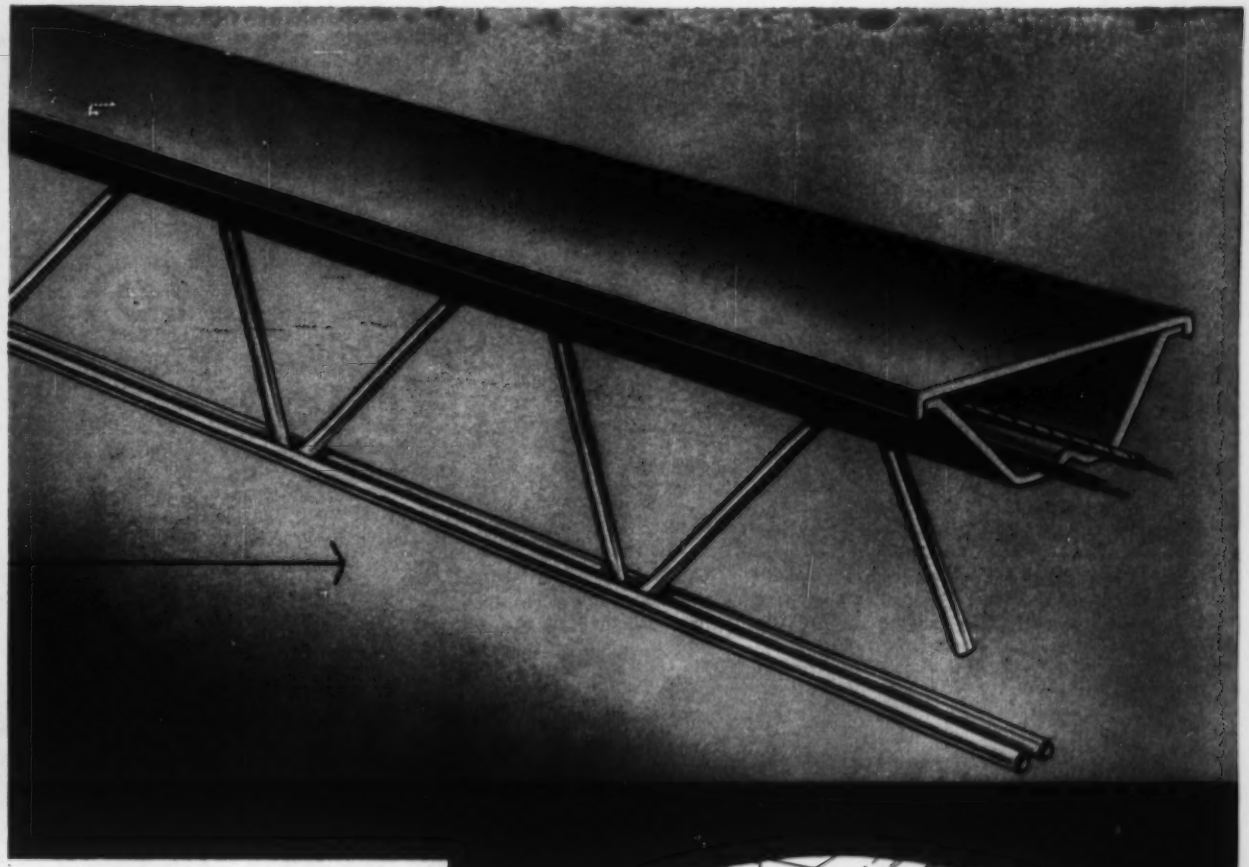

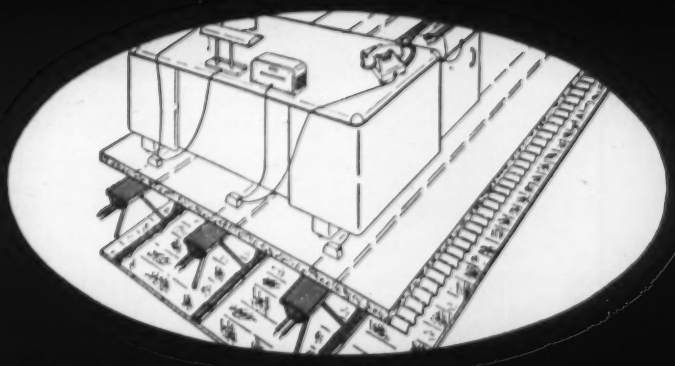

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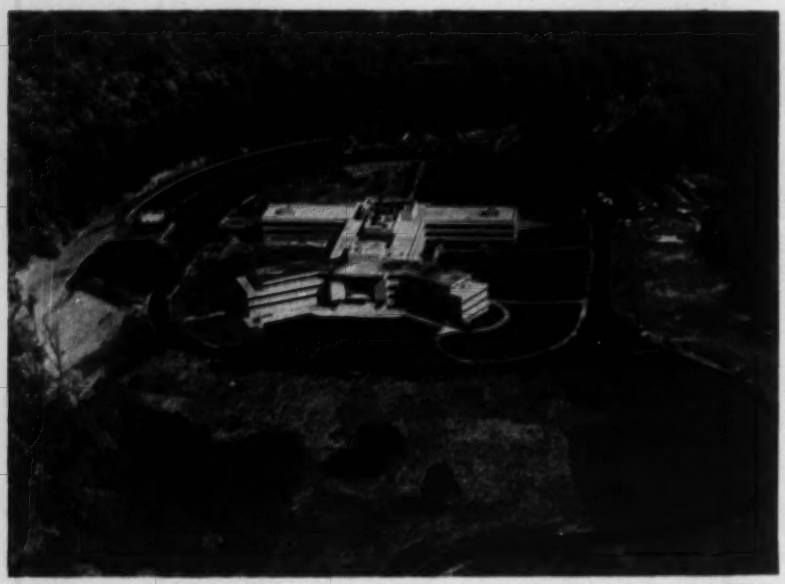

SUBURBAN HEADQUARTERS for standard Vacuum Oil Co. was completed in White Plains, N. Y., 35 miles north of New York City. Other big companies last year changed their minds about moving to the suburbs, kept the boom in city office building rolling.

PRESTRESSED CONCRETE FRAMING was used for a 540 x 560 ft, two story building in Boeing Developmental Center, Seattle, Wash.

reinforcement at ultimate load shall not be assumed greater than the yield point or 60,000 psi, whichever is smaller.

• **Prestressed concrete trends**—In 1956, the new prestressed concrete industry continued its rapid growth, and the trend to pretensioning was accented. At year's end, there were about 160 prestressing plants in the U. S., the Prestressed Concrete Institute estimates —about 50% more than at the end of 1955. The PCI believes prestressed concrete production in the U. S. was 150% greater in 1956 than in the previous year.

Post-tensioning also made headway. The Intercontinental Equipment Co., New York City, manufacturer of prestressing equipment, estimates its anchorage-cone sales last year to be 4.5 times those of the previous year.

Last year also, improvements were adopted that lowered costs. Techniques for fabricating pretensioned beams with deflected strands, for example, improved the economy of this type of member. In addition, several fabricators cut costs even more by anchoring some of the tendons in the interior of the span, preventing bond of the steel to the concrete near the ends.

Most popular tendon for pretensioning last year was the 7-wire, stress-relieved strand in $\frac{1}{2}$ and $\frac{7}{16}$-in. sizes, reports H. H. Edwards, president of LEAP Concrete, Inc. He believes, however, that this year there will be a trend to the larger size because of lower overall cost in material, handling, labor and efficiency of design.

Enough experience has been gained with prestressing that fabricators are now considering industry-wide standardization of shapes of members and fabrication practices. A joint committee of the American Association of State Highway Officials and the PCI is developing standards for bridge beams. Mass-production techniques are being encouraged by standarization of reel sizes, adoption of one or two strand sizes and use of standard forms. (One company furnishes a pre-engineered structural bay, with columns spaced 20 x 40 ft, which is reported to be 15% cheaper in price than custom-built units.) And the PCI has established a committee to prepare a manual of design and construction.

Other noteworthy trends in prestressing include less emphasis on allowable unit working stresses and more on ultimate strength and the possibility of beams cracking. Also, more consideration is being given to allowing some tension in certain members, such as roof slabs, and to partial prestressing (use of ordinary reinforcing in prestressed beams to resist tension).

As techniques improve, longer and longer spans are feasible with prestressed members. Last year, 136-ft post-tensioned girders were erected for the roof of a hangar at Hill Air Force Base, Ogden, Utah (ENR May 24, 1956, p. 51), and beams with an overall length of 147 ft and clear span of 138 ft were placed in the roof of a gymnasium-auditorium for Parkview High School, Springfield, Mo.

• **New records**—Last year also, a record was established for distance spanned with light-gage steel. Galvanized steel arches with 100-ft span were erected to form the roof over the arena of a 262 x 200-ft coliseum in Phoenix, Ariz.

The galvanized metal was formed into 9 x 2-ft sections, curved both longitudinally and transversely, which were bolted together to form the corrugated barrel arch. Each section was crimped transversely also for added stiffness. The roof is supported along its edges on the roof framing over the seating areas.

At Montana State College, Bozeman, Mont., the biggest timber-framed dome ever built was constructed for the roof of a field house. The dome is 300 ft in diameter and has a rise of 51 ft (ENR Jan. 10, p. 32).

In New York City, steel erection started last year for two of the largest buildings to have connections made with high-tensile bolts. Both are 38 stories high, but one—the House of Seagram—extending to a height of 520 ft, is 50 ft taller than the other. And a new record height of 30 stories for an all-welded building was set by the Continental National Bank, Fort Worth, Texas.

In West Palm Beach, Fla., a world's record was set for long-span glued-laminated wood arches. Forming the roof of the 3,500 seat Jai Alai Fronton, the three-hinged arches span 242.5 ft. They have a rise of 74 ft and a total length of 294 ft.

A construction contract was awarded for the world's second largest steel sphere. To house a nuclear reactor for Commonwealth Edison Co.'s power

Air Force Academy, Colorado Springs, Colo. T. F. Scholes, Reading, Pa., gen. contr., Long Const. Co., Kansas City, Denver and Detroit, sub-cont., Skidmore, Owings and Merrill, Architect.

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GLASS-FIBER ROOFING tops the roof deck over Ford's 1.1 million sq ft Mercury assembly plant, Rosemead, Calif. Walls are precast concrete and aluminum siding.

plant near Chicago, the sphere will be 190 ft in diameter. Inside will be a 15-story high reinforced concrete structure that will support the reactor and auxiliary equipment. (The world's largest sphere is at West Milton, N. Y. It is 225 ft in diameter.)

While reinforced concrete buildings in the U. S. still hover around maximum height of about 23 stories, construction has started on a 45-story building in Sao Paulo, Brazil. The Italia Building, elliptical in plan, will tower 443 ft above the city's streets. It will steal the height record from a 41-story office building in Buenos Aires, which was completed last July. And in the Argentine seaside resort of Miramar, work has started on a reinforced concrete building that will provide 775,000 sq ft of commercial and apartment floor area and will be 40 stories high. (A 30-story building at 110 Williams St., New York City, will be of reinforced concrete construction, except that columns in the lower 18 stories will be structural steel.)

• **Space frames**—The need for larger and larger floor area in hangars unobstructed by columns, to keep pace with the growth of airplanes, was one of the principal factors last year encouraging the trend to long-span roof framing. To improve the economy of long spans, some engineers were utilizing cable suspension or some form of space frame, or both.

At Kansas City, Mo., an airframe overhaul building has a folded-plate, reinforced concrete roof projecting 150 ft on both sides of a central section and hung from cables. Long-span floors in the central section also are of folded-plate construction. At Philadelphia International Airport, 130-ft projecting roof of a maintenance hangar is suspended from cables anchored to a leanto along the rear. And in Miami, Fla., work started last year on a nose hangar with folded-plate concrete roof cantilevering 110 ft. The chief advantage of the projecting-roof designs appears to be that the door openings can be made as long as desired without obstruction from roof supports.

Some pioneering attempts were made in the U. S. in 1956 to explore the potentialities of hyperbolic paraboloids. (These have been successfully employed in Europe and Mexico.) The advantage of this type of thin-shell construction is that the double-curved surface can be formed with straight boards.

One project where this shape was used is a gasoline service in Fayetteville, N. C., completed last fall. Diamond-shaped in plan, the 2½-in. thick, reinforced concrete shell measures 70 ft on the long diagonal and 45 ft on the shorter. It is supported principally at two points (ENR Oct. 25, 1956, p. 33).

Hyperbolic paraboloids will be used in roof construction in the 5,000-acre industrial district being constructed by Great Southwest Corp. between Dallas and Fort Worth.

• **Lift-slab trends**—In 1956, acceptance of the Youtz-Slick lift-slab method of construction accelerated. In this method, concrete floors and roof slabs are cast at ground level and raised into position by jacks set atop the columns.

From the original development in March 1950 to the beginning of 1956, slightly more than 10,000,000 sq ft were lifted. Last year, over 6,500,000 sq ft was raised. And at the beginning of this year, 5,600,000 sq ft were under contract.

Records were set last year both for weight of lifts and height of buildings. Last fall, New England Lift Slab Corp., one of U. S. Lift Slab Corp.'s licensees, raised a 1,466-ton, 32,600-sq ft slab for the roof of an industrial building in Lyndhurst, N. J. (ENR Nov. 22, 1956, p. 25). In Cincinnati, a 10-story, 77-ft high pidgeon-hole parking garage was erected by the lift-slab method (ENR May 3, 1956, p. 25).

Improvements also were made to make the method more economical. For example, the six slabs that form the floors and roof of the Litchfield County Hospital, Winsted, Conn., were prestressed (ENR Nov. 22, 1956, p. 24). The Lynhurst, N. J., slab mentioned previously is of waffle construction, made of lightweight concrete, which was placed on corrugated fiberboard forms.

• **Thin-wall office buildings**—During 1956, the trend to thin walls for the exterior of tall structures continued.

The porcelain Enamel Institute estimates that $60 million was spent last year for architectural porcelain enamel, an increase of more than 20% over the previous year, a substantial portion of the total being credited to thin-wall construction.

The total amount of aluminum that went into this application could not be accurately estimated. One major fabricator, General Bronze Corp., Garden City, N. Y., reports that 1956 production was 10% higher than 1955, which in turn was about 20% greater than in 1954. Another, Michael Flynn Mfg. Co., Philadelphia, says 1956 production was up 47% compared with 1955.

No estimates were available for stainless steel, except that production of wall panels of this material is accelerating rapidly.

Meanwhile, masonry producers are taking steps to meet the competition from metal and concrete-panel fabricators with thin-wall assemblies of their own.

The Structural Clay Products Research Foundation, Geneva, Ill., has developed a ¾-in. thick clay slab with a "Norman brick" face size, called SCR Re-Nu-Veneer; a 2¼-in. thick brick panel with steel-reinforced cement-grouth backing; a structural ceramic glazed clay tile unit, 4 in. thick, which has a 60% sound absorption and a sound transmission loss of 47 db unplastered; an unusually lightweight clay brick; and mortars with bond strengths exceeding 200 psi, instead of the usual 50 psi.

The Indianna Limestone Institute, Bedford, Ind., announced the availability of a through-wall sandwich unit. It consists of a 3-in. stone facing, 2 in. of rigid insulation and 3 in. of natural stone aggregate with a resin emulsion binder. Another new assembly is a large panel made of 2-in. stone facing and 2 in. of wood-fiber concrete.

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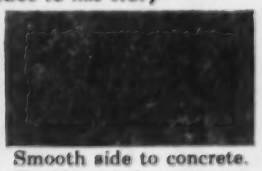

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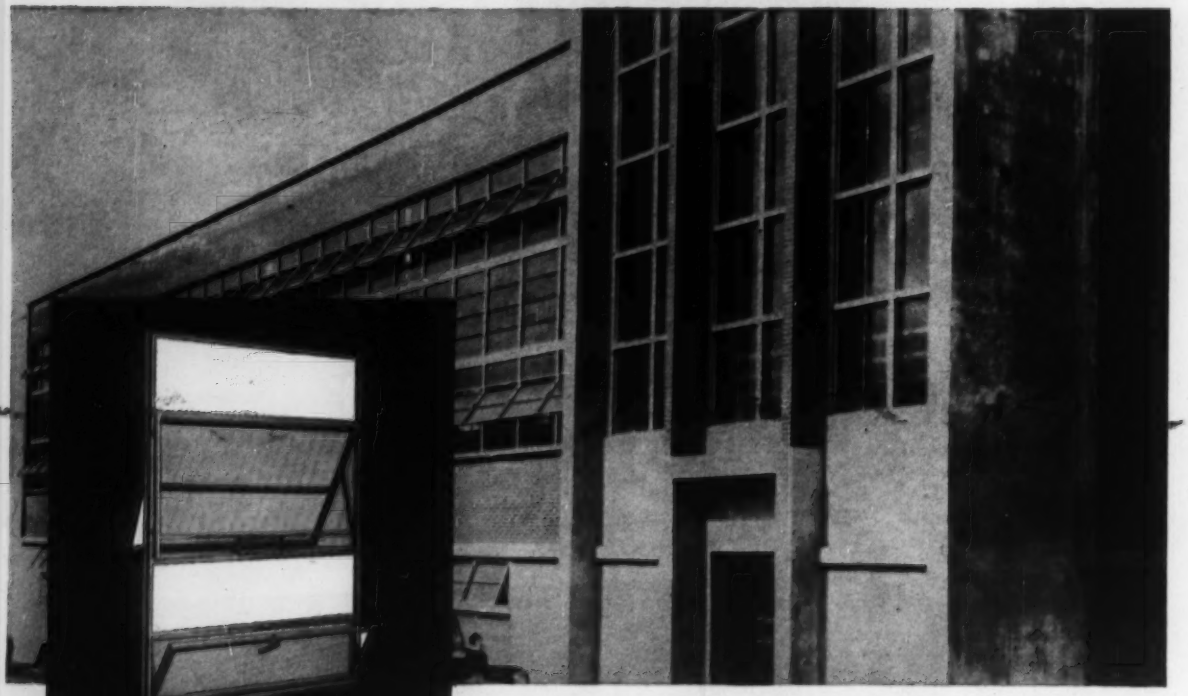

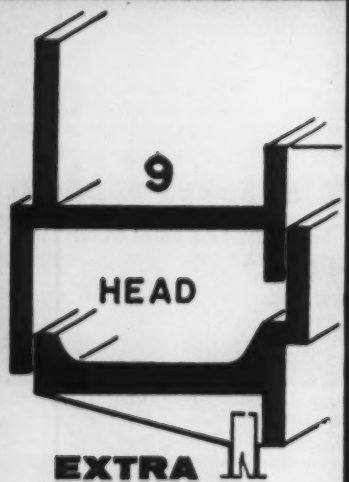

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Also a prefabricated ceramic veneer (architectural terra cotta) unit has become available. Called CV Panelwall, it has been installed on the exterior of the Methodist Hospital, Arcadia, Calif. It consists of a 1-in. ceramic-veneer facing and 2 in. or more of lightweight reinforced concrete. A much thinner panel (1¾ in. thick) is being developed.

For the exterior walls of a 4-story office building in Minneapolis, 2-in. thick cellular-glass units were assembled into a single unit for installation as backup above and below each window. The walls are only 3½ in. thick. They consist of an exterior facing of opaque, colored glass panels separated from the panelized backup by a 1-in. air space.

• **Plastics in buildings**—Sandwich panels were also used last year with plastics for facings and insulation. One example is a one-story factory and office building in Grand Rapids, Mich., where the panels have opaque white surfaces of resin-laminated glass-fiber cloth bonded to ⅛-in. asbestos-cement sheets. This facing encloses an expanded polystyrene-resin insulating core.

Many other applications of plastics in building construction were readily discernible last year: vapor barriers and curing membranes made of vinyl, polyethylene or oriented polyester; styrene foam insulation; striated styrene wallboard, dome and pan forms made of glass-fiber reinforced polyester; sprayed-on roofing of mineral-filled vinyl, neoprene latex and mineral-filled acrylic coating; siding and roofing of glass-fiber reinforced polyvester or acrylic sheet; plastic-insulated wire for radiant heating; plastic diffusion sheets for translighter ceilings; plastic ducts and piping; and calking and glazing materials made of plastics.

• **More air conditioning**—There was also an accelerated trend to air conditioning last year. Some indication of the industry's growth can be obtained from the year-end review of Cloud Wampler, chairman of the board, Carrier Corp.:

Central air conditioning of residences will increase from 175,000 systems worth $262,500,000 at retail installed during the past year to 250,000 at $375,000,000 during 1957, he predicted. Packaged air-source heat pumps will expand from about 10,000 systems installed in 1957 to 30,000 annually in 1961.

The air conditioning of existing office buildings hit a new high during 1956, Wampler reported. And air conditioning of indusrial plants for greater employee efficiency has shown a spectacular climb during the year just completed, with Garrier orders for this type of installation increasing 255%.

• **Lessons from failures**—Several accidents involving buildings under construction occurred last year. While some of these are still under investigation to determine the cause of failure, enough information is available to indicate probable causes that engineers would be wise to avoid in the future.

Collapse last fall of a concrete warehouse roof at Robins Air Force Base, near Macon, Ga., focussed attention again on the failure at Wilkins Air Force Base in 1955, to which it was similar. The warehouses are of one-story rigid-frame construction.

Consultants have reported that the Wilkins AFB failure could have been caused by a combination of conditions, such as faulty design assumptions, overestimation of tensile strength of concrete, "frozen" expansion joints and volumetric changes in concrete (ENR Jan. 12, 1956, p. 21). Another report on these failures is expected to be available soon.

One of the most spectacular failures was the sudden collapse of a wing of a four-story concrete office building under construction in Jackson, Mich., last October. Official reports on the cause have not yet been released. However, examination of the reinforced concrete columns still standing suggests that the collapse could have resulted from punching shear of the flat plates at the columns. There were 10x14-in. openings for ducts and piping along two sides of some interior columns, which were 20, 23 and 25 in. square (ENR Oct. 11, 1956, p. 24).

On the same day, a 20x30-ft bay in a five-story reinforced concrete parking garage under construction in Jackson, Miss., dropped to the ground. The forms were supported on shores 30 ft high on top of which were 4x6-in. timbers with the 6-in. face vertical. One explanation for the failure that was advanced is that the collapse was triggered by the action of equipment placing and vibrating the concrete, which kicked out the 4x6's. Lack of diagonal bracing may also have been a contributing factor (ENR Oct. 11, 1956, p. 25).

Lack of bracing may also have been responsible for the sidewise tilting of an 8-story lift-slab parking garage under construction in Cleveland (ENR April 19, 1956, p. 25). At the time of the mishap, the slabs had been raised but were held temporarily by steel wedges on the underside only. Generally, steel shear plates are welded to the lifting collars embedded in the slab and to the columns, to anchor the slabs in place as soon as they are positioned. This time, the erector planned to weld all connections at one time. The building was salvaged by use of jacks that pushed it back to the vertical (ENR June 14, 1956, p. 26).

Also, last April, eleven 160-ft welded steel rigid frames collapsed during erection of a cargo shed in the Long Beach, Calif., harbor (ENR April 5, 1956, p. 25). Some purlins and monitor steel were in place and eave braces attached on one side, but there was no bracing on the other side except guys.

In Orlando, Fla., last August, the prestressed concrete roof of a one-story school just completed collapsed in a rainstorm. There appears to be a possibility that the reinforced concrete lintels supporting the roof members may not have been adequate and that the roof beams may not have had sufficient prestress or depth.

Major Building Projects

• **New York City Board of Education**—During 1956, 18 schools, one addition and four modernizations were completed, providing 26,300 pupil-stations, at a total construction cost of $40.9 million. Under construction last year were 60 schools providing 78,000 pupil-stations, at a total construction cost of $166 million.

• **Brooklyn Civic Center**—The Supreme Court Building, a 12-story, $17.8 million, steel-framed structure, with 8,650,000 cu ft of space, is now closed in, and finishing work is proceeding in the interior. The Brooklyn House of Detention for Men was completed last year, at a cost of $10.6 million. Occupying a whole block, this structure is 11 stories high and has facilities that are designed to accommodate 817 inmates. A $750,000 home for the Red Cross chapter also was finished. These buildings join a Domestic Relations Court, Transportation Building, Welfare Building and World War II Memorial, which were completed previously.

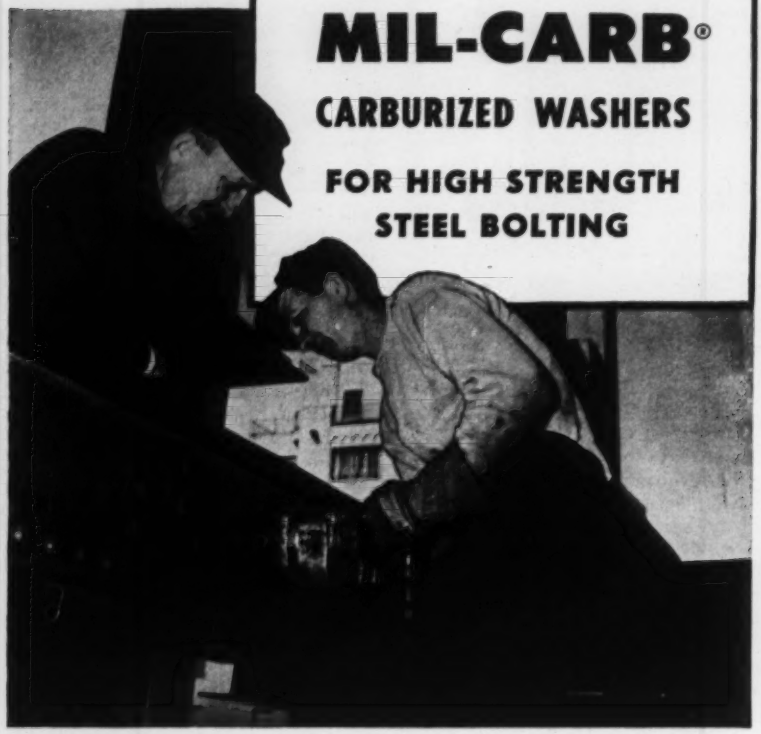
• *Photo courtesy Russell, Burdsall & Ward Bolt and Nut Co.*

WHY MORE AND MORE CONTRACTORS SPECIFY

MIL-CARB®

CARBURIZED WASHERS

FOR HIGH STRENGTH STEEL BOLTING



Contractors know a nut and bolt assembly is only as strong as its washers. That's why in high strength structural steel bolting, quality-conscious consulting engineers and contractors demand washers that match the best nut-and-bolt assemblies in . . .

1. **High tensile strength**
2. **Holding power**
3. **Uniformity**

On all three counts, Mil-Carb Carburized Washers fill the bill best—developed *specifically* by the world's largest producer of washers to meet the needs of modern structural steel jointing.

Mil-Carb Washers are fabricated from *prime* carburizing quality special soundness steel to insure strength to equal or exceed the rigid specifications of ASTM designation A-325.

Maximum holding power is assured by a closely supervised carburizing process which retains inner ductility of the metal, yet provides an exceptionally hard "outer skin". It's this tough "outer skin" which permits torquing nuts to specification maximums without danger of "galling" or grinding of the washer . . . imperative for permanent, uniformly strong, tight joints!

In addition, Mil-Carb Washers are uniformly flat and smooth with dimensions conforming to current requirements for heavy plain washers (carburized) of the American Standards Association (ASA Designation: B27.2).

For permanently strong, tight joints that become integral parts of the steel structure . . . *as permanent as the steel itself* . . . specify Mil-Carb Carburized Washers. Available in six sizes, from ⅝" to 1⅜", packed in 200-lb. kegs.

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UNITED STATES STEEL CORPORATION
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WROUGHT WASHER MANUFACTURING CO.
The World's Largest Producer of Washers
2224 S. BAY ST., MILWAUKEE 7, WIS.

VERTICAL LOUVERS on east and west and horizontal sunshades on north and south shelter the Tishman Building, Los Angeles, from the sun.

tall and very narrow—180 ft long by only 38 ft wide—wind shears will be taken by concrete walls at the building ends.

• **750 Third Ave.**—Now in the foundation stages is a 34-story, air-conditioned office building at 47th St. in New York City. Facade features dark-gray aluminum spandrels.

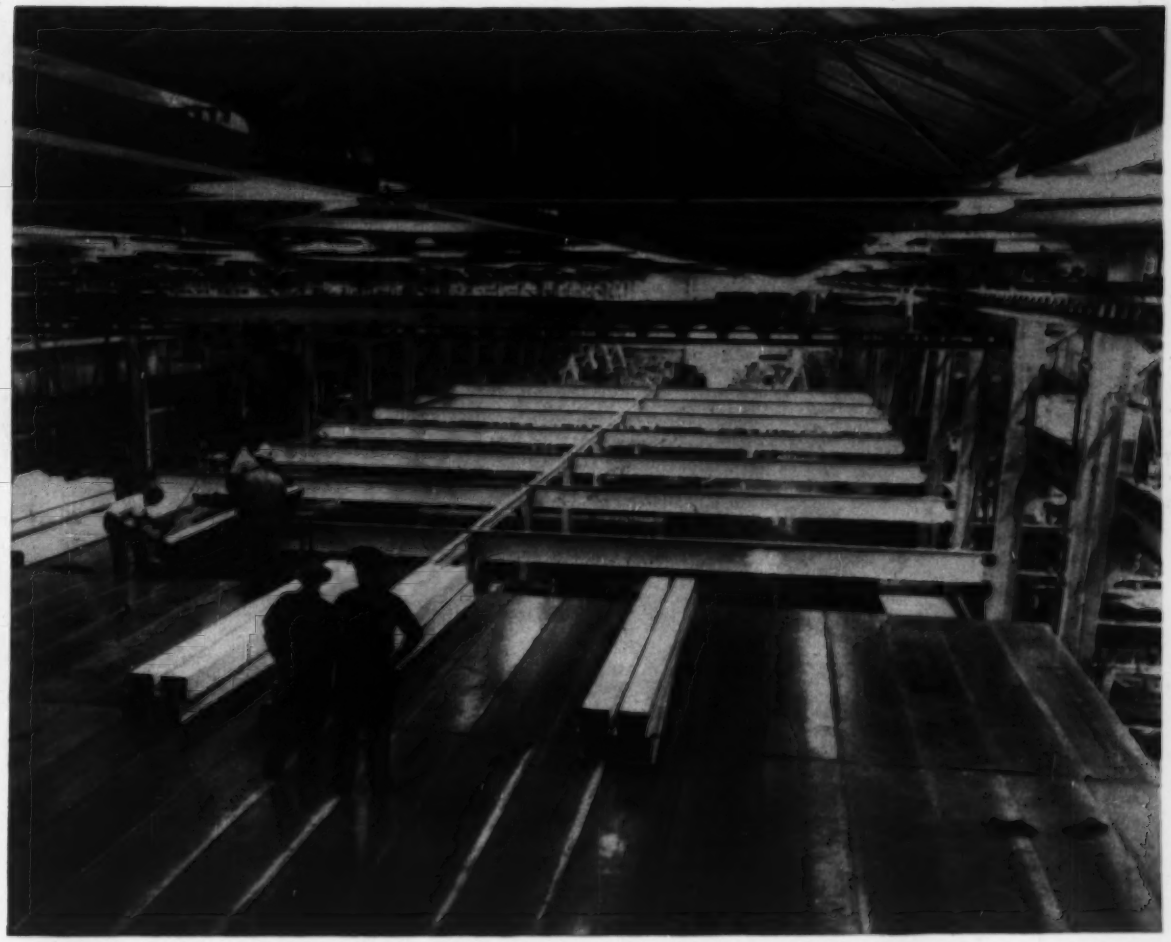
• **20 Broad St.**—The 27-story, air-conditioned office building adjoining the N. Y. Stock Exchange in New York City will be finished this month. At the fifth floor level, the upper 22 stories of the building are supported on plate girders to eliminate columns from the trading floor.

• **Port of New York Authority**—Construction started in 1955 on the main structures of the $90 million Terminal City at New York International Airport and is scheduled for completion this June. A 3-story Arrival Building, 760x415 ft, with two double-deck 240-ft fingers will handle incoming international passengers. Two Airline Wing Buildings, each 600x80 ft, will house ticket counters, lobbies and offices.

• **575 Lexington Ave.**—The 34-story, air-conditioned office building now in the foundation stage at 51st St. in New York City will have a gold-colored aluminum exterior. Aluminum projected-type windows will alternate with fixed sash.

• **Socony Mobil Building**—Enclosed in stainless steel, this 45-story, air-conditioned office building at 42d St. and Lexington Ave. in New York City was completed last year. Air conditioning is accomplished by turbo-compressors and absorption equipment.

• **111 W. 40th St.**—Foundation work is under way for a 34-story, air-conditioned office building on the Avenue of the Americas in New York City. It will be enclosed with granite, light-colored brick and aluminum windows.



Fenestra Industrial Mezzanine under construction at Douglas Aircraft Co., Torrance, California.
Architect: Van Dyke & Barnes, Los Angeles. *Contractor:* W. R. Steyer Co., Los Angeles.

Fenestra* Building Panel MEZZANINES

add new plant working space at low cost!

There's valuable expansion space right over your head in your present plant building. A low-cost mezzanine constructed of Fenestra Building Panels can put it to work. Combining light weight with high strength, these cellular steel panels span up to 31 feet. In many cases, the original structural steel is strong enough to take the additional load of the mezzanine.

In the photo, above, you can see how easily Fenestra Building Panels are erected without disturbing production. They form the structural subfloor for the mezzanine with a minimum depth. A concrete pad about 2½" thick with mesh reinforcement is poured on top of the panels to distribute any concentrated load. Fenestra Metal Wall Panels and Steel Windows may be used to enclose the mezzanine space. If you need more space in your present plant, call your local Fenestra Representative. He can give your architect or plant engineers complete information. Or, mail the coupon below for your FREE copy of the 1957 Fenestra Building Panel Catalog that gives you complete design data.

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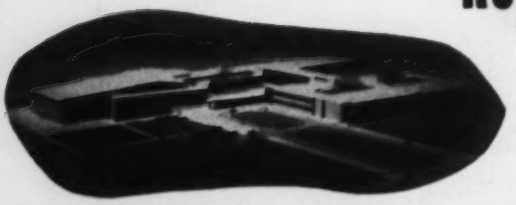
Republic High Strength Bolts
HELP SPEED



Royal Oak Clarence Kimball High School, Royal Oak, Michigan.
Architects: Odell and Hueleft and Luckemback.
General Contractor: O. W. Burke Company.
Structural Fabricator: Decroupet Iron Works Company.

CONNECTIONS ARE SWIFT AND SURE when Republic High Strength Structural Bolts are used in place of ordinary rivets. Steelwork goes up faster and better at less cost per installed fastener. Vise-like action of bolt gives maximum resistance to fatigue caused by dynamic loading.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

CLASSROOM CONSTRUCTION, WITH ECONOMY

Here's a suggestion to help you keep pace with the accelerating demand for classrooms. Specify Republic High Strength Bolts to speed structural-steel erection. Moreover, you'll secure lower cost per installed fastener in comparison to field-driven rivets.

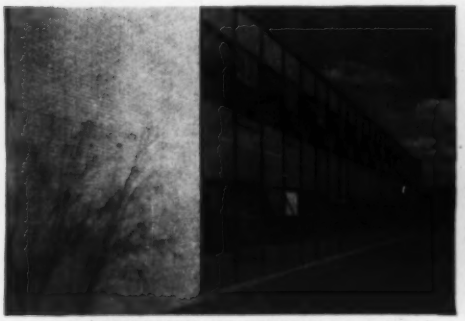
These were the results attained in the Clarence Kimball High School, Royal Oak, Michigan, shown under construction on the opposite page. Steelwork, handled by Decroupet Iron Works Co., of Detroit, Michigan, was erected quickly and easily by two-man bolting crews. Old-fashioned riveting, requiring a heater and three riveters, was eliminated.

In addition to speed and economy of construction, you receive several other important benefits through use of Republic High Strength Structural Bolts.

For example, far greater joint strength is secured. High Strength Bolts are not only stronger than comparable rivets but exert a powerful clamp action when torqued tight. Forces normally carried in shear in the rivet are transmitted by friction through the structural members themselves.

Other advantages include increased safety through reduction of fire and accident hazards; reduced noise level through replacement of ear-splitting riveting guns by faster, quieter impact wrenches; and complete salvageability of structurals through elimination of torch-cutting disassembly when basic building rearrangements are necessary.

Get full information on savings, speed, strength, simplicity and safety made possible by Republic High Strength Bolt construction techniques. Simply call your Republic representative, or mail coupon today.



SAVINGS IN TIME AND MONEY are two major advantages you gain through use of Truscon Vision-Vent® Window Walls. Their use helps maintain construction and interior-finishing schedule in any weather. "U" factor is equivalent to masonry wall. Send coupon for facts.

STRONG, LOW-COST ROOFING is provided by Truscon Ferrobord® Steeldeck. Flat, pitched or curved areas are roofed over quickly. All work is done from top. Ferrobord is clipped or welded directly to steel joists. Fully interlocked throughout for strong, tight joints.

TRUSCON "O-T" STEEL JOISTS give you predictable and dependable load-bearing capacity. Every Truscon "O-T" Joist — shortspan series — is quality protected. Each is backed by the Steel Joist Institute Seal of Approval. Be safe . . . avoid inferior quality. Specify approved Truscon "O-T" Steel Joists for lightweight, fire-resistant floor and roof support.

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Company_____

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Concrete Bars

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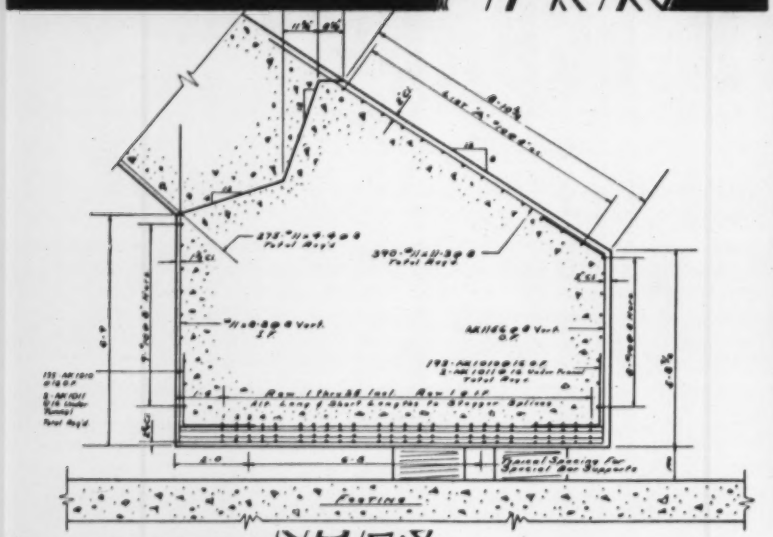

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50 YEARS OF SERVICE

HKP CONNORS STEEL DIVISION

H. K. PORTER COMPANY, INC.

COLUMN-FREE INTERIOR is achieved in Inland Steel's 19 story home office, Chicago, with 58 ft girders spanning building's width.

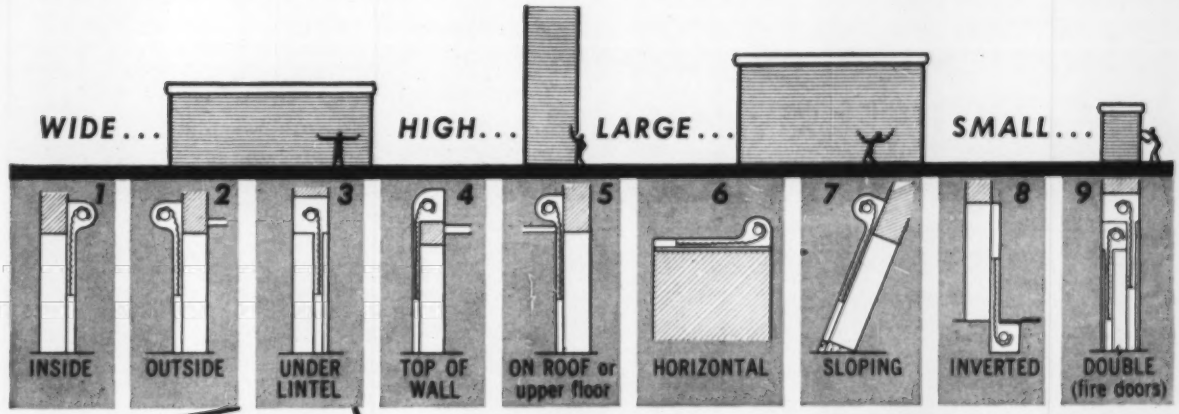
• **New York City Housing Authority**—Construction contracts awarded during 1956 totaled $60 million. Last year, 6,832 apartments were completed, 5,393 started and 11,706 entered the design stage. By year's end, NYCHA had 16,645 apartments under construction and 30,952 being designed.

Douglass Houses was the biggest project started last year. It has 1,999 apartments in 15 buildings ranging from 9 to 20 stories high, which will cost $19.5 million to construct.

• **Concord Village**—Four 15-story apartment houses are being constructed in a 10-square block area in Brooklyn, N. Y., adjoining the new civic center. The $10 million project will provide 532 units.

• **Canada House**—This 27-story office building at 54th St. and Fifth Ave. in New York City is in the foundation stage. Fully air conditioned, it will be enclosed with limestone, the vertical lines of the tower being emphasized by stone fins.

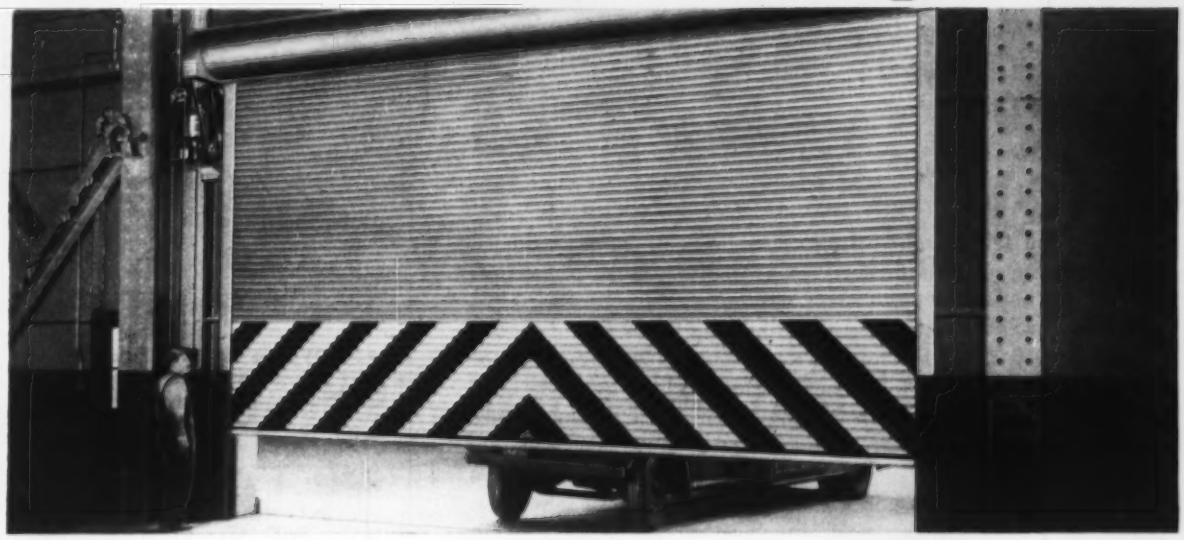
• **House of Seagram**—Enclosed in bronze mullions and spandrels and pink-gray glazed windows, the 38-story, air-conditioned office building on Park Ave., between 52nd and 53rd St., in New York City, has a bolted steel frame, probably the tallest of this type. The steel has been topped out and about 50% of the bronze panels have been installed.



Quick Guide to Kinnear Door Versatility

Solve Every Door Need With

Kinnear Steel Rolling Doors



Whether your door needs are standard or special, Kinnear Rolling Doors save time, cut costs and add protection more ways than any other type of closure.

You get these multiple advantages from the coiling action of Kinnear's interlocking steel-slat curtain *(originated by Kinnear)*. These Kinnear advantages fit special needs *more different ways* than any other type of door. For example, sketches show:

1. Mounted on inside wall; coils above doorway.
2. On outside wall; leaves ceiling clear.
3. Hood under lintel or concealed in wall.
4. Hood above lintel or on top of wall.
5. Hood above roof or upper floor level.
6. Sloping doorway (chutes, hoppers, etc).
7. Horizontal mounting (openings for observatory, ventilator or similar eqpt.
8. Inverted mounting (coil below door sill).
9. Kinnear Steel Rolling Fire Doors on either side of wall — or a service door and a Kinnear Steel Rolling Grille (all-steel protection that doesn't block light, air or vision).

No matter how they're installed, Kinnear Rolling Doors open completely out of the way . . . need no usable, floor, wall, or ceiling space for either storage or operation . . . give you extra all-metal protection against fire, theft, wind, weather, or vandalism. Built any size; motor or manual operation; for old or new construction. Extra-heavy galvanizing assures lasting resistance to corrosion, Kinnear's special Paint Bond brings quick, thorough coverage and lasting adhesion of any paint you may apply. *Write for full information on Kinnear Rolling Doors to fit your needs!*

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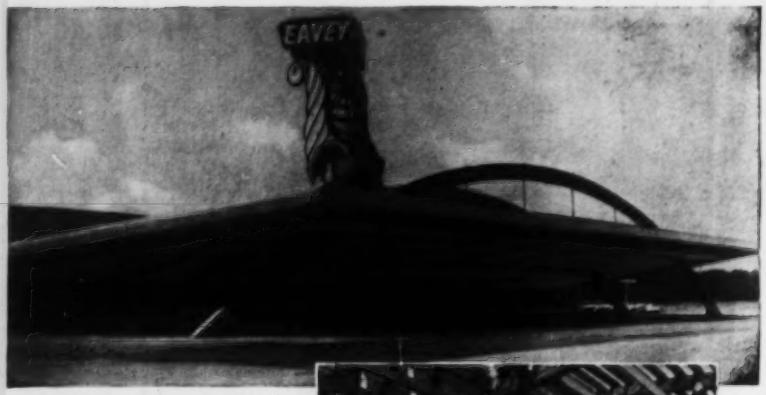
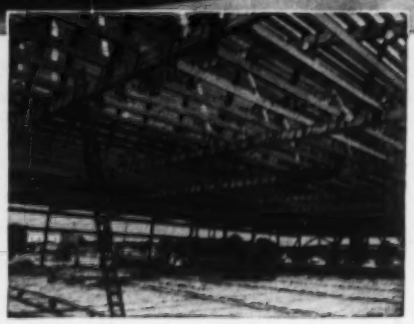
Supermarket spans years of construction progress . . . USES *Ramset*®!





Ramset System **saves $10,000 and two months' time for new Ft. Wayne Supermarket**

Using the latest construction methods, contractors completed Eavey's Supermarket in Fort Wayne, Indiana, ahead of schedule and ahead of budget!

The electrical contractor reported hanging 10,000 feet of conduit carrying 350,000 feet of wire, with RAMSET, using 100,000 fasteners for the job. About $10,000 and two full months were saved by using speedy RAMSET SYSTEM, according to George Clement, service engineer for Eavey's. Other contractors saved in the same way.

RAMSET FASTENING SYSTEM can be used in a variety of ways on most jobs: electrical, plumbing, air conditioning, door, window and wall installations. Moreover, RAMSET is just as valuable in the plant maintenance operation as to the original builders and contractors.

You can anchor almost anything to concrete and steel with RAMSET. New catalog is ready, send for your copy now.

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Baby brother to RAMSET, this hammer-in tool uses no cartridge, but makes your own hammer power more effective. For masonry, mortar joints, cinder block. Ask for literature.

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OFFICE BUILDING, 30 stories high, is one of about 20 skyscrapers under construction in New York's midtown.

• **485 Lexington Ave.**—The 30-story, air-conditioned office building at 47th St. in New York City is being occupied. Facade features dark-gray aluminum spandrels.

• **800 Second Ave.**—Under construction since last March and now completed, the 18-story office building at 42d St. and Second Ave. in New York City is the tallest lightweight-concrete building yet erected. From street to penthouse roof, it is 250 ft high.

• **110 William St.**—An air-conditioned, 32-story office building was started last year in the downtown insurance district of New York City, scheduled for completion in 1958. The structural frame will be reinforced concrete, except for the columns in the lower 8 stories, which will be steel.

• **425 Park Ave.**—This 31-story office building, between 55th and 56th St., on Park Ave. in New York City, was completed last fall. The facade features white enameled brick piers and black glass spandrels.

• **400 Park Ave.**—Completion of the 21-story, air-conditioned office building at 54th St. in New York City is expected this year.

• **General Electric Co.**—A sixth manufacturing building has been placed under construction at Appliance Park, headquarters for the Major Appliance Division, near Louisville, Ky. The five existing buildings, with a total floor area of about 3,000,000 sq ft were completed in 1954. The new unit is 800x300 ft, estimated to cost about $30 million.

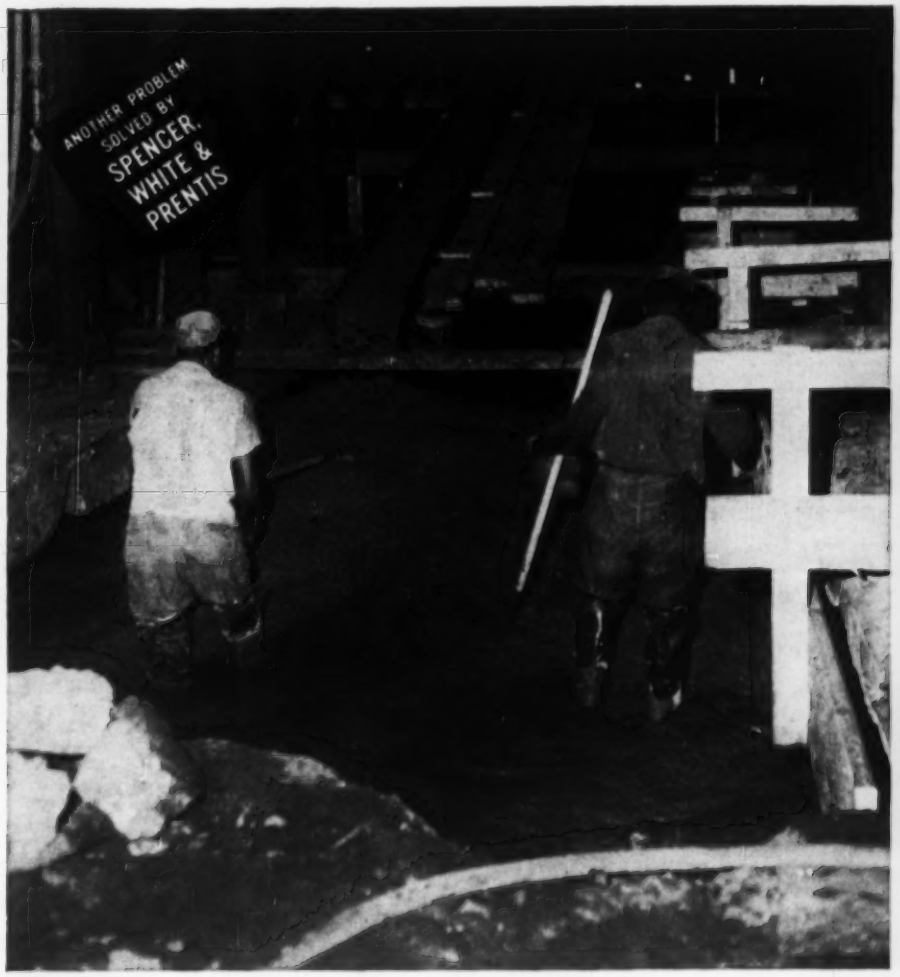
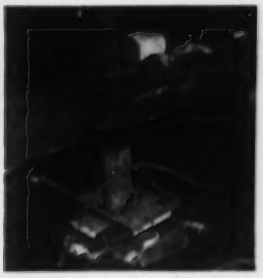


Photo shows gaping hole in south-bound roadbed



Hydraulic jacks installed to support columns

Concrete is chuted in through an opening cut in tunnel roof

Project: Restoring washed-out subway roadbed for New York City Transit authority

SUBWAY WASHOUT: HERE'S HOW FAST IT'S REPAIRED

When New York City's Old Wanamaker building went up in flames, tons of water required to quench the fire reached the East Side subway—almost directly below—and washed out a roadbed section 100x130 ft., up to 8 ft. in depth. City officials feared repairs might take weeks when the Transit Authority sent its rush-call to Spencer, White & Prentis, who had handled many of their previous jobs. Actually, the roadbed was perfectly restored in 84 hours by experienced engineers and crews, thus enabling the Transit Authority to replace tracks and resume subway service in minimum time. Large photo shows cavity being filled with 300 cu. yds. of concrete. Other job highlights are pictured in the smaller photos to the right.

CATALOGUE ON REQUEST

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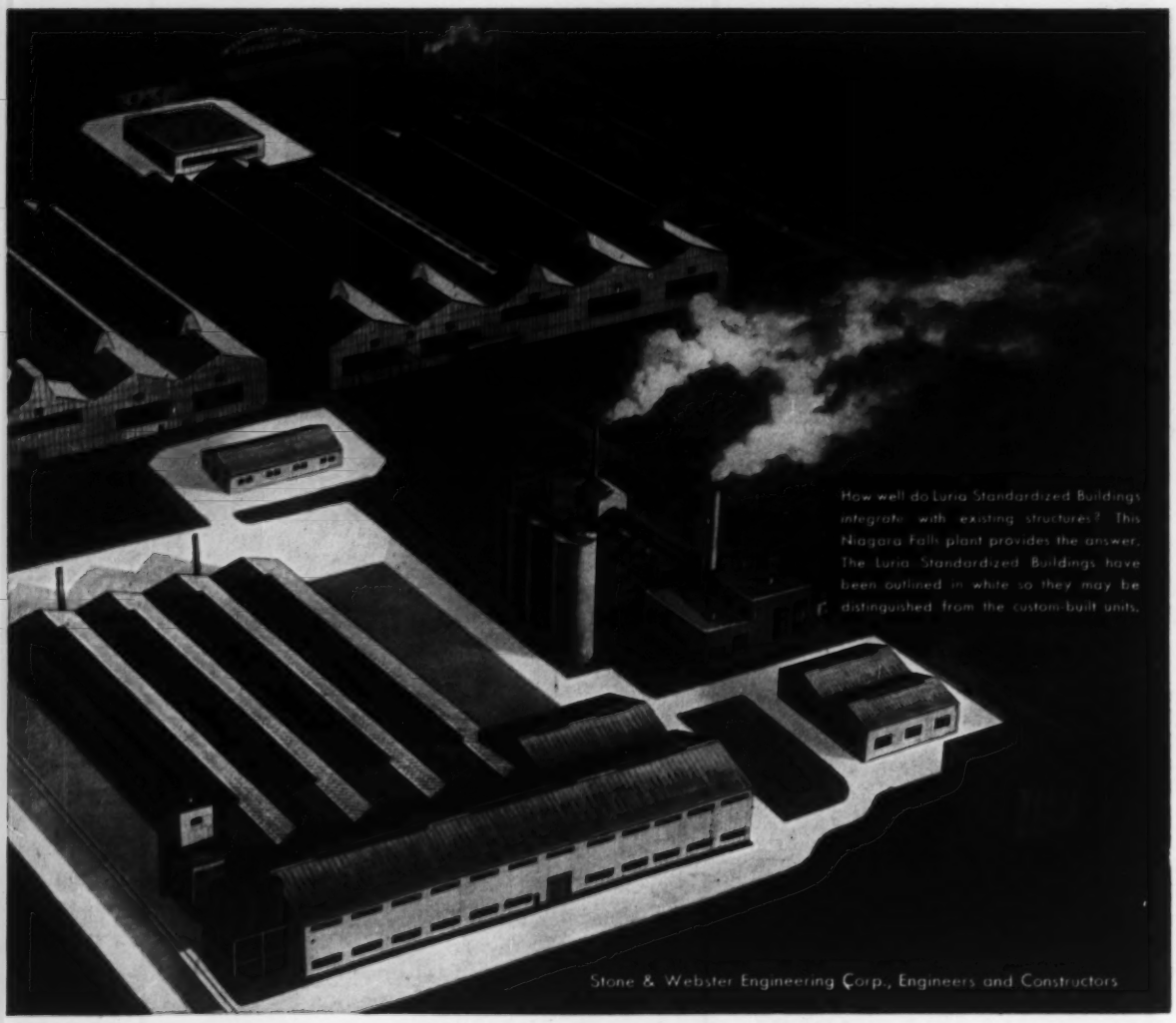

How well do Luria Standardized Buildings integrate with existing structures? This Niagara Falls plant provides the answer. The Luria Standardized Buildings have been outlined in white so they may be distinguished from the custom-built units.
Stone & Webster Engineering Corp., Engineers and Constructors

Why International Graphite and Electrode Division of Speer Carbon Company chooses LURIA Buildings

Luria puts the permanence and flexibility of custom-built structures into your expansion program... without sacrificing the assets of standardization.

All the advantages of custom-built units are included in Luria Standardized Buildings. Designed for *durability*, Luria structures surpass the most stringent building code regulations. And Luria's standardized components are *engineered for adaptability*. They combine to successfully meet *individual* architectural needs. If these are the requirements of *your* expansion program, Luria Engineering can provide them for you...at less than the cost of custom-built units and in far less time.

LURIA ENGINEERING Company

511 FIFTH AVENUE, NEW YORK 17, NEW YORK *Plants:* BETHLEHEM, PA. • CHICAGO HEIGHTS, ILL.
District Offices: ATLANTA, BOSTON, PHILADELPHIA, CHICAGO, WASHINGTON, D.C., RICHMOND, PITTSBURGH

CIGARETTE PLANT for P. Lorillard Co., Greensboro, N. C., is one of the few of its type only one-story high. Operating departments are air conditioned.

• **Inland Steel Co.**—A 19-story home office building in Chicago is scheduled for fall completion. It will be enclosed with stainless steel panels. There are no interior columns in the structure, though typical floors are 177x58 ft. Cellular steel floor decking is topped with 2½ in. of lightweight concrete.

• **Montana State College**—The $1.5-million field house in Bozeman, Mont., nearing completion, sports the biggest timber-framed dome ever built. Covering a column-free area of 70,000 sq ft, the dome is 300 ft in diameter.

• **530 Fifth Ave.**—This 26-story office building in New York City, between 44th and 45th St., has an all-welded steel frame. The exterior is limestone. Fully air conditioned, it will be ready for occupancy in April.

• **666 Fifth Ave.**—The 38-story office building between 52d and 53rd St. in New York City has a bolted steel frame. The exterior consists of aluminum spandrels embossed with small squares of white porcelain-enameled mullions set in polished aluminum frames. Fully air conditioned, it will be completed in May.

• **Trans World Airlines**—Two buildings have been constructed with cable supported roof. At Kansas City, Mo., an $8 million, 820-ft long airframe overhaul building has 130,880 sq ft of column-free space in each of its two main bays. A folded-plate, reinforced concrete roof projects 150 ft over each bay, hung from cables anchored in concrete walls atop a 100-ft wide central section of the building. The second and third floors of this section also are of folded-plate construction and are hung from the anchor walls. At Philadelphia International Airport, the 270x130-ft concrete-decked roof of a maintenance hangar is suspended from cables anchored to a concrete leanto along the rear.

• **General Motors Technical Center**—The 25 buildings in the center at Warren, Mich., near Detroit, were dedicated last May. The steel-frame structures, clustered around an artificial lake, have metal sandwich walls and end walls of a new-type glazed brick. The project provides 2,250,000 sq ft of floor area.

• **Long Island Arena**—The largest building with glued-laminated wood arches, a sports arena in Commack, N. Y., is 350x205 ft. The three-hinged arches span the 205 ft with a rise of 65 ft, measuring 240 ft around the curve.

• **Jai Alai Fronton**—A 3,500-seat arena at West Palm Beach, Fla., set the world's record last year for long-span glued-laminated timber arches. The three-hinged arches span 242.5 ft with a rise of 74 ft and have a total length of 294 ft.

• **Ford Motor Co.**—The Central Office Building was completed last fall in Dearborn, Mich.—9 miles from downtown Detroit. The 12-story building, costing in excess of $15 million, provides office space for 3,100 Ford administrative employees. It rises 200 ft in height and contains 950,000 sq ft of floor space. The curtain-wall exterior is constructed of insulated porcelain-glazed steel panels, aluminum framing and tinted, heat-absorbing glass. Columns are encased in concrete and sheathed in sheet aluminum. Over 205,000 sq ft of glass is used for the exterior and interior.

Ground was broken in March for a 1,100,000-sq ft Mercury division assembly plant in Rosemead, Calif. The structure has a structural steel frame, aluminum sash and siding, precast concrete walls and a builtup glass-fiber roof. Construction began in September on a $20 million aluminum casting foundry at Listerhill, Ala.

• **Detroit Civic Center**—Two major contracts are under way and a third one will be awarded this year for the $49 million Convention-Exhibit Building. A $3 million substructure contract, awarded last May will be completed this June. An $8.7 million contract was awarded last December for fabricating the 19,500 tons of structural steel required for the structure, with deliveries to start this August. Bids for the $29 million superstructure are expected to be received about July 1 of this year. Completion of the building is scheduled for late 1959 or early 1960. The $3.8 million, 725-car Ford Auditorium Underground Garage is virtually complete and in operation. The $5.7 million Henry and Edsel Ford Auditorium with a seating capacity of 2,926 was completed last October. The first section of the Civic Center Plaza is now under construction and scheduled to be completed early this year at a cost of $4 million. The second section of plaza will cost about $3 million but plans have not yet been finalized.

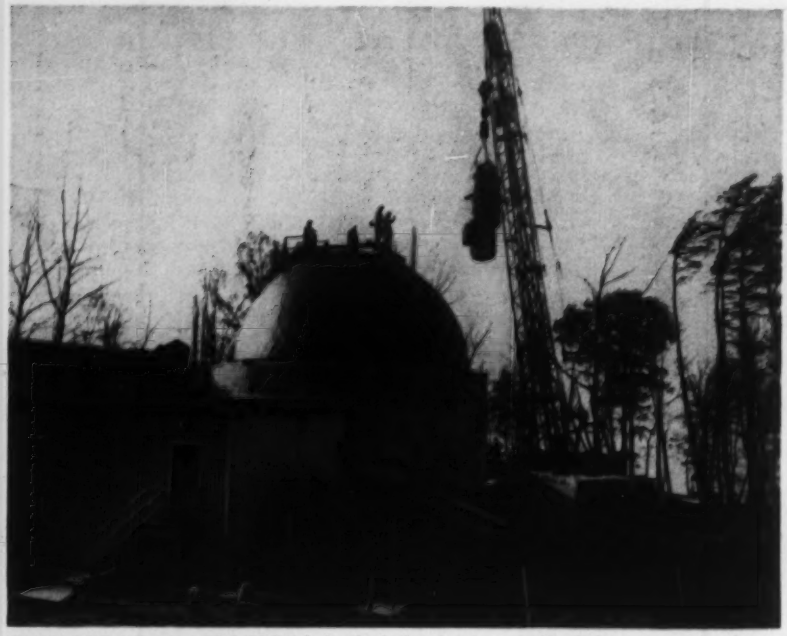
• **Borg-Warner Building**—Under construction at Michigan Ave. and Adams St. in Chicago, this 20-story office building will furnish 431,231 sq ft of floor area and 5,096,793 cu ft of space. It will be enclosed in a curtain-wall of aluminum or stainless steel vertical fins and window sash, with spandrels of navy-blue porcelain enamel. Completion of the building is scheduled for late this year or early 1958.

• **Aluminum Company of America**—Foundation work is under way for a 150,000-ton smelting plant near Evansville, Ind. The $80 million project includes a 375,000-kw steam power plant on the Ohio River. There will be 30 major buildings providing more than 1,000,000 sq ft of floor area. The pot line building, rectifier building, carbon rodding building, and the pot lining and grinding buildings will each be 1,100 ft long. The administration building will be enclosed in blue anodized aluminum curtain walls. Construction of the buildings has not yet started, but initial production is scheduled for this fall.

• **Lutheran Office Building**—Completed last year in Minneapolis, Minn., at a cost of $2.5 million, the Lutheran Brotherhood's Home Office Building provides 95,100 sq ft of floor area. The 6-story reinforced concrete structure is enclosed in a curtain-wall of blue-green, porcelain-enamel on 16-ga steel, bonded to 2-in. glass-foam core, and backed with 18-ga galvanized sheet. Double-glazed windows are composed of pane light of tinted heat-absorbing glass and one pane of plate glass.

• **Kaiser Aluminum & Chemical Corp.**—Construction started last year on a $70 million alumina plant at Gramercy, La., 35 miles northwest of New Orleans. Alumina capacity will be 430,000 tons per year. The plant also will produce caustic soda and chlorine. Completion is expected this year.

• **American Cyanamid Co.**—A $40 million expansion of the Frontier plant, near New Orleans, was begun in 1956. The first unit, a $4.5 million monomethyl styrene plant, was completed in April. Other construction



PACKAGE POWER REACTOR being built for the Army at Ft. Belvoir nears completion with installation of its 16 ton reactor vessel under the vapor-container dome.

in a five-year plan to double production at this plant includes duplication of existing facilities for acrylonitrile ($25 million) and possible facilities for derivatives of that chemical ($9.5 million).

• **New Orleans Civic Center**—Total estimated cost for the group of city and state office buildings in the center is $20 million. First to be completed—about mid-April—will be the $4 million, 11-story city hall. Work has begun on three more of the five buildings, which will occupy a seven square block site where once stood slums. A $4 million, 8-story state office building is scheduled for completion early in 1958; a $1.8 million, 2-story state supreme court building, with steel now erected, will be finished this summer, and a $2.5 million, 2-story main public library, early in 1958. The only building not yet under way is the $2 million civil courts building. All buildings will be air conditioned. An adjoining garage will accommodate 700 official cars, and off-street facilities are being provided for 400 more.

• **New Orleans Housing Authority**—The first section, containing 508 units, of the $24 million, 1,860-unit Desire housing project was completed last June. The remaining units are scheduled for occupancy this month.

• **Granite City Steel Co.**—The $30 million expansion program, which began in Dec., 1955, is expected to be completed late in 1958. The program will increase capacity by 47%, to 1,584,000 ingot-tons annually. A new blast furnace has been finished, but construction is to begin in March on a sintering plant to enrich iron ore.

• **Union Electric Co.**—Section No. 3 of the Meramec power plant, on the Mississippi River just south of St. Louis, was started in 1955 and will be completed in 1958. It will increase the capacity of the plant by 280,000 kw, doubling the present potential of the first two sections. The new unit is a steel-framed structure with metal siding. Total cost of the three sections is expected to be about $80 million.

• **Tennessee Valley Authority**—Three steam power plants were completed last year. The last of ten 150,000-kw units was installed in the Shawnee plant, on the Ohio River, 12 miles downstream from Paducah, Ky. Estimated cost of this plant is $216 million. Also the last of the three 200,000-kw units for the John Sevier plant was placed in operation. Built on the Holston River, 60 miles northeast of Knoxville, Tenn., the plant cost $87.5 million. And the two-unit $81.5 million Gallatin plant, on the Cumberland River, 25 miles northeast of Nashville, Tenn., was completed. The 250,000-kw units in this plant are the largest in the TVA system.

• **International Business Machines Corp.**—A 600,000-sq ft one-story electric-typewriter manufacturing plant in Lexington, Ky., is framed with precast concrete columns and post-tensioned beams and girders. In a typical 40x50-ft bay, prestressed roof beams spaced 8 ft 4 in. c-c span the 40 ft. Beams and girders are of hung-span construction. The first phase, providing 300,000 sq ft, is about 75% completed. Also, construction started last May on a $21 million engineering and manufacturing facility in San Jose, Calif. Seven buildings are under way, and five more will be completed early in 1958.

• **University of Florida**—A $17,535,000 program now under way includes a $9 million teaching hospital, to be completed in 1958; $1 million physics building; $1.2 million College of Education laboratory building, started in December; $3.5 million dormitories; $2 million for married students housing units; and $400,000 for fraternity and sorority houses, of which two of four planned have been started.

• **National Airlines**—A reinforced concrete nose hangar in Miami, Fla., about 30% completed, incorporates a 3-story, 480x50-ft center section with 110-ft cantilevers providing space for servicing six DC-8's. Depth of the enclosed section is increased to 130 ft by the door construction. The roof is a reinforced concrete folded plate.

• **Sears-Roebuck & Co.**—Retail store in Tampa, Fla., about 25% completed, is 250x400 ft, two stories high. A reinforced concrete folded-plate roof spanning in the 250-ft direction is supported on only one interior row of columns.

• **Illuminating Building**—The reinforced concrete frame of this 21-story office building for the Cleveland Electric Illuminating Co., in Cleveland, is slightly more than half completed. Installation of the aluminum exterior has started.

• **Roosevelt Field Shopping Center**—The $30,000,000 project near Mineola, L. I., was opened for business last year. Situated on a 150-acre site, formerly an airfield and golf course, it will provide over 1,000,000 sq ft of floor area when it is completed.

• **Owens-Illinois Glass Co.**—Construction started last May on a glass container plant at Hapeville, Ga., Atlanta suburb. Equipped with two of the largest glass furnaces in the industry, it will be capable of producing 400 tons per day. The building wall enclosing most of the 100x80-ft furnace areas will be open at the bottom for ventilation. The plant will be completed this summer.

• **Duquesne Light Co.**—Work proceeded at full speed throughout 1956 on the first full-scale nuclear-energy power plant in the U. S. At year's end, the nuclear portion of the plant was a little more than half finished, and the conventional section and the structure housing the reactor were about 80% completed. When finished this year, the reactor will produce at least 60,000 kw and the turbo-generator will have a maximum capability of 100,000 kw.

• **Levittown, Pa.**—An estimated 15,500 houses are now sold and occupied. The

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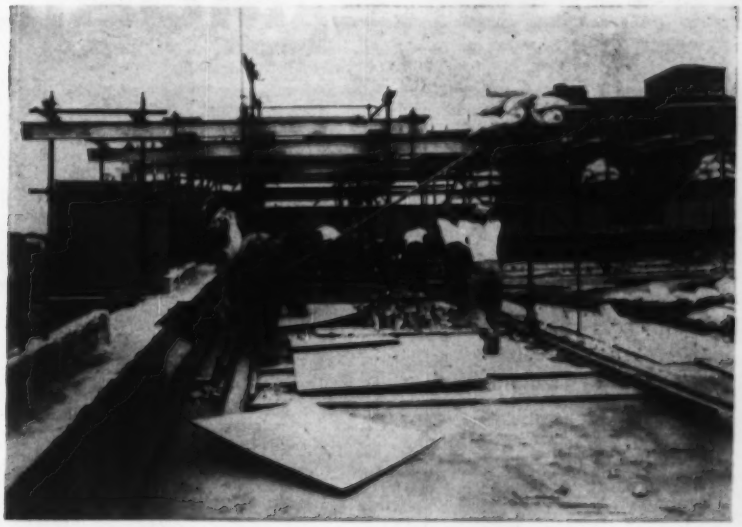

ROLLING CANTILEVER—Sam M. Duff, contractor, quickly removes cornice from Barker Brothers Building, Long Beach, Calif. from "TubeLox"® Scaffolding hung from cantilevered, rolling I-beam structures. Note channel tracks for easy movement and counterweight. This method, selected because permanent sidewalk canopy prevented use of built-up scaffolding, shows how a minimum amount of equipment can effectively perform the job.

"DOME" WORK FROM TOWERS—Working from 30' Model B Aluminum Sectional Rolling Scaffolds and from the ground, men of Geodesics, Inc., erect this frame for a 100' diameter dome in two days. Nylon tent attaches inside frame. Dome is for United States Industries Exhibits Pavilion, International Trade Fair, Kabul, Afghanistan.

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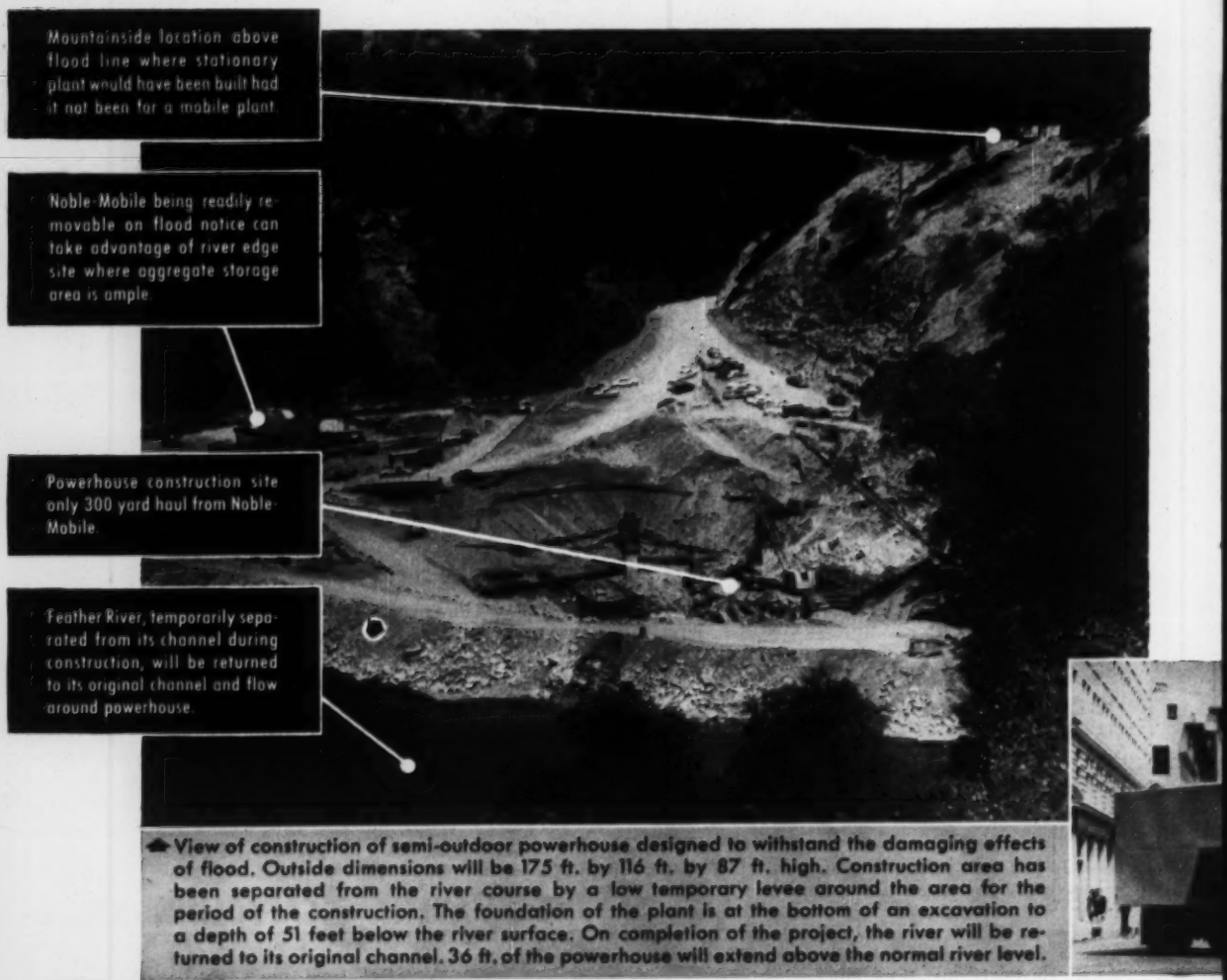
How NOBLE-MOBILE solved flood

Flash floods that could wash away a fixed batching plant installation were a threat at the site of the powerhouse construction by the Bechtel Corporation for Pacific Gas & Electric Company on the Feather River, California. A gravel bar at the river edge was the logical site for a concrete batching plant because it was the only place with sufficient area for aggregate storage. Yet, with flood danger, the only practical alternative site was a point 110 ft. up the canyon wall off the Western Pacific Railroad right-of-way. A stationary plant there would have required extensive concrete foundations and a major earthmoving job to level an area of sufficient size to store aggregates. The site also would have entailed transit truck hauls under all weather conditions down a steep grade.

Noble-Mobile made the mountainside installation unnecessary. This batching plant on wheels was put into operation at the river edge as it could be hauled out to high ground on only a day's notice of flood. The mobility permitted scheduling work for 12 months a year so that the job could be completed by 1958. Noble-Mobile saved 70% in installation costs as against a stationary, mountainside plant. On this project, Noble-Mobile normally has to operate only 50% of the working day in order to provide the 25,000 yards of concrete that ultimately will be used. The batch is hauled by transit trucks to the construction site only 300 yards distant.


Mountainside location above flood line where stationary plant would have been built had it not been for a mobile plant
Noble-Mobile being readily removable on flood notice can take advantage of river edge site where aggregate storage area is ample
Powerhouse construction site only 300 yard haul from Noble-Mobile
Feather River, temporarily separated from its channel during construction, will be returned to its original channel and flow around powerhouse

View of construction of semi-outdoor powerhouse designed to withstand the damaging effects of flood. Outside dimensions will be 175 ft. by 116 ft. by 87 ft. high. Construction area has been separated from the river course by a low temporary levee around the area for the period of the construction. The foundation of the plant is at the bottom of an excavation to a depth of 51 feet below the river surface. On completion of the project, the river will be returned to its original channel. 36 ft. of the powerhouse will extend above the normal river level.

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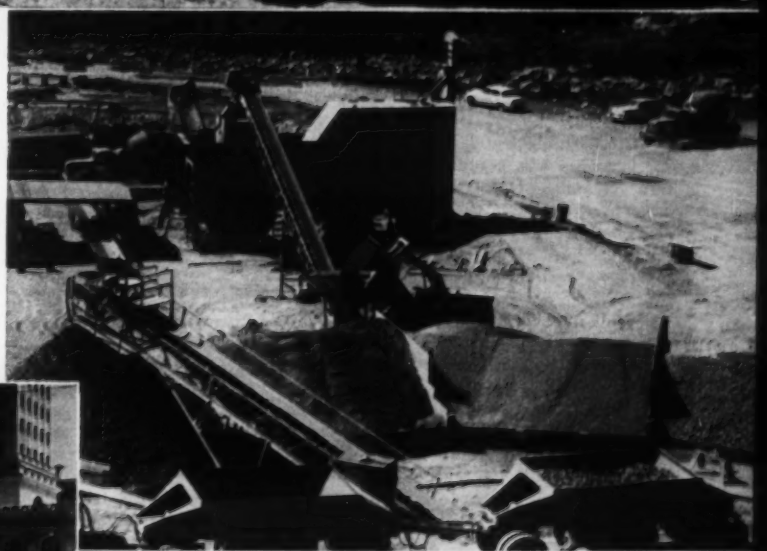

1,000 yards of 2½", 1½", ¾" aggregates and sand, hauled by truck from Oroville 25.1 miles away, are stored in compartmented piles at the site. They are fed by a scooploader to a conveyor leading to the plant. The materials are automatically batched and discharged by a conveyor to the transit trucks for the approximate 2-minute haul to the pouring site.

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UNION OIL CENTER in Los Angeles will consist of four office buildings, including a 13 story structure for which the steel frame is nearly complete.

present population of this community, which is being built from scratch, is about 55,000. The first family moved in June, 1952. When completed, Levittown, Pa., will have more than 17,000 houses, and with a population of about 70,000 will be the 10th largest city in Pennsylvania. Prices of dwellings range from $10,500 (833 sq ft plus an unfinished second floor) to $20,000 (1,640 sq ft plus an unfinished second floor).

• **Sharpstown, Texas**—The first section of 1,000 houses was completed last year in this community. It is being built on 6,500 acres near Houston, which annexed it at year's end. Also, a golf course and swimming pool were finished; a $2 million junior high school was started, and grading was under way for a freeway connecting with Houston that will bisect Sharpstown.

• **National Security Agency**—Fall completion is expected for the $20 million, air-conditioned, three-story office building at Fort George G. Meade, Md. The reinforced concrete frame has been enclosed with over 1,100 precast concrete sandwich panels with exposed green-stone aggregate.

• **Brookhaven National Laboratory**—The new medical center at Upton, N. Y., will incorporate in a cylindrical building the first nuclear reactor in the U. S. designed exclusively for medical research and treatment.

• **Memphis, Tenn.**—Construction started last year on the city's $121 million, 750,000-kw steam electric generating station. Foundation work, including the driving of 6,300 piles, is under way. The plant will have 400-ft high smokestacks. Its three turbo-generators are each rated at 250,000 kw.

• **Campbell Soup Co.**—A plant in Napoleon, Ohio, with 20 acres of floor, is 70% completed and is expected to be finished this year. Two buildings house air-conditioned plant offices, laboratory and cafeteria, locker rooms, medical and personnel departments. Other buildings incorporate a complete food-processing operation, cold-storage warehouse, tomato-processing plant, can-making plant and boilerhouse. The processing plants and cold-storage warehouse have a reinforced concrete frame, the other buildings a steel frame.

• **Pittsburgh Plate Glass Co.**—Works No. 7 in Cumberland, Md., is now manufacturing rough glass and shipping it to other plants for grinding and polishing, but by the middle of 1957, twin grinding and polishing equipment will be set up. The plant is more than three-quarters of a mile long. All operations from unloading raw materials to processing the finished product will be fully automatic. Buildings have a structural steel frame, concrete spandrel walls with insulated, corrugated asbestos-cement above, and insulated metal roof deck.

• **P. Lorillard Co.**—A cigarette manufacturing plant in Greensboro, N. C., completed last year is one-story high, covers 526,000 sq ft. All operating departments, offices and laboratories are air conditioned. A 120,000-sq ft manufacturing room in the new plant features a suspended acoustical metal-pan ceiling.

• **Southland Center**—Excavation was completed at year's end for this $40 million project in Dallas, Texas, which will consist of a three-story, block-square base above which three towers will rise. One is a 42-story home office building for Southland Life Insurance Co. The second is a 28-story, 600-room hotel for Sheraton Corporation of America. The third tower still is in the proposed stage. A five-level, 2,000-car underground garage, plus 175,000 sq ft of retail store area, also are included in the project.

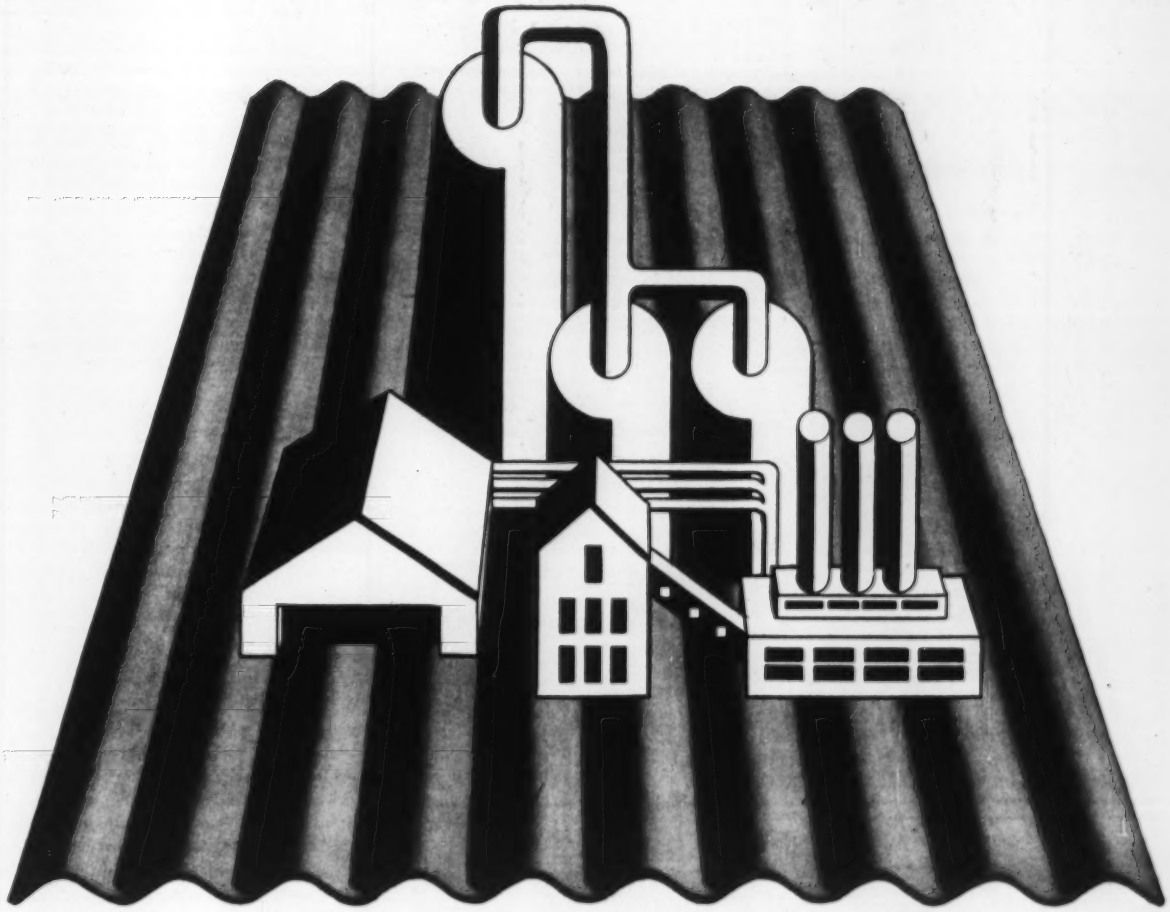
• **Atomic Energy Commission**—A $10-million headquarters building near Germantown, Md., is 35% completed and should be finished by next November. It occupies a 109-acre site 26 miles from Washington, D. C. The main building has six wings, four and five stories high. It has a reinforced concrete frame and brick exterior walls.

A $33 million uranium processing facility at Weldon Spring, near St. Louis, Mo., has been completed except for one production unit, to be finished in March, 1958.

• **Bank of the Southwest**—The 24-story office building with an all-welded steel frame in Houston, Texas, has been completed. The exterior was faced with story-high aluminum panels.

• **American Gas & Electric Co.**—Construction has started on two steam electric plants with record-breaking 450,000 kw units. Excavation is under way for the $58 million Breed plant of Indiana & Michigan Electric Co., an AG&E subsidiary, near Terre Haute, Ind. The second unit will go into the Philip Sporn plant on the Ohio River, near Graham, W. Va.

• **Air Force Academy**—Construction of the new academy near Colorado Springs, Colo., is on schedule, with Sept. 1, 1958, as target date for initial operation. At the end of 1956, $10 million worth of construction was completed; $57 million of work under way; and $73 million obligated, including land acquisition, architect-engineer contract services and construction. By the end of this year, the Air Force Academy Construction Agency expects to have a total of $68 million worth of construction completed and in place. This figure will be increased to $84 million by the fall of 1958, when the first class of cadets move in. Among the buildings to be started this year are the cadet dining hall, administration building, science building, communications building, physical education complex, bachelor and visiting officer quarters and personnel dormitories. Construction to be completed in 1957 includes utilities in the service and supply area, academic area and housing area; reservoirs and pump stations; sewage treat-



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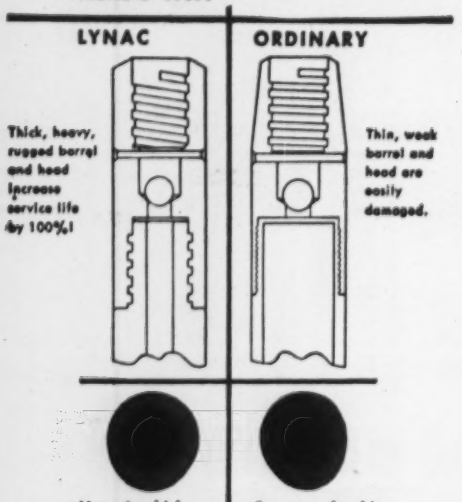
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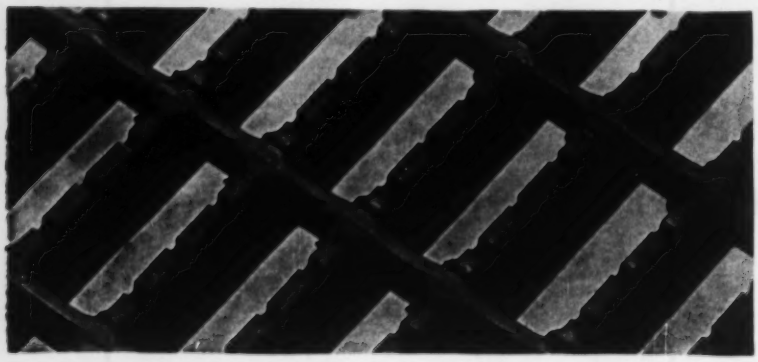

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ment plant; telephone trunk lines and electrical distribution system; and buildings in the service and supply area.

• **Los Angeles Schools**—By year's end, nearly 90% of the $133 million school construction bond issue, voted in 1955 had been allocated; 38 projects had been completed or were under construction and 126 others were in various planning stages. More than 50 additional, financed by the 1952, $130 million bond issue, also were underway at the end of the year. Among those projects completed under the 1952 bond program were six new elementaries and 2 new senior highs.

Los Angeles State College launched a major construction program at its Ramona and Valley campuses. While only temporary buildings reached the construction stage in 1956, some $20 million was spent or appropriated during the year for expansion of the two campuses. Much of this work will begin early in 1957. An additional appropriation of over $20 million will be requested for the 1957-58 budget year.

• **California Electric Power Co.**—Construction of unit one of the San Bernardino steam power plant was three-fourths completed in 1956, and should be ready for operation in June, 1957. Initial foundation work on the second 60,000-kw unit was started during the year, with completion date set for June, 1958. Total cost of the two units will run over $20 million. Site preparation was in progress at the end of 1956 for the first $10 million, 61,000-kw unit of the utility's Barstow steam station, scheduled for service late in 1959. Construction date on a second similar unit has not been set. A $2.5-million San Bernardino headquarters building, started during the year, is expected to be finished late next summer.

• **Union Oil Center**—A $20 million office center in Los Angeles, started late in 1955, was well along by the close of 1956. The 3-floor underground on-ramp parking area, with a 1,500 car capacity, was totally finished, and the steel framework of the main 13-story building had reached 75% completion. Steel structure for the other 3 buildings—one three-story, and two two-story—not yet above the surface, is expected to go up early in 1957.

• **Kaiser Steel Corp.**—Biggest single project to get underway on the West Coast in 1956 was Kaiser Steel's $113 million expansion of its Fontana, Calif., mill. The expansion, which will mean a 40% increase for Kaiser in production of steel ingots and finished steel, includes an oxygen steelmaking process plant, new slabbing mill, and expansion of the hot strip, plate and tin mills. Construction on major units is not yet above ground, but concrete foundation work is

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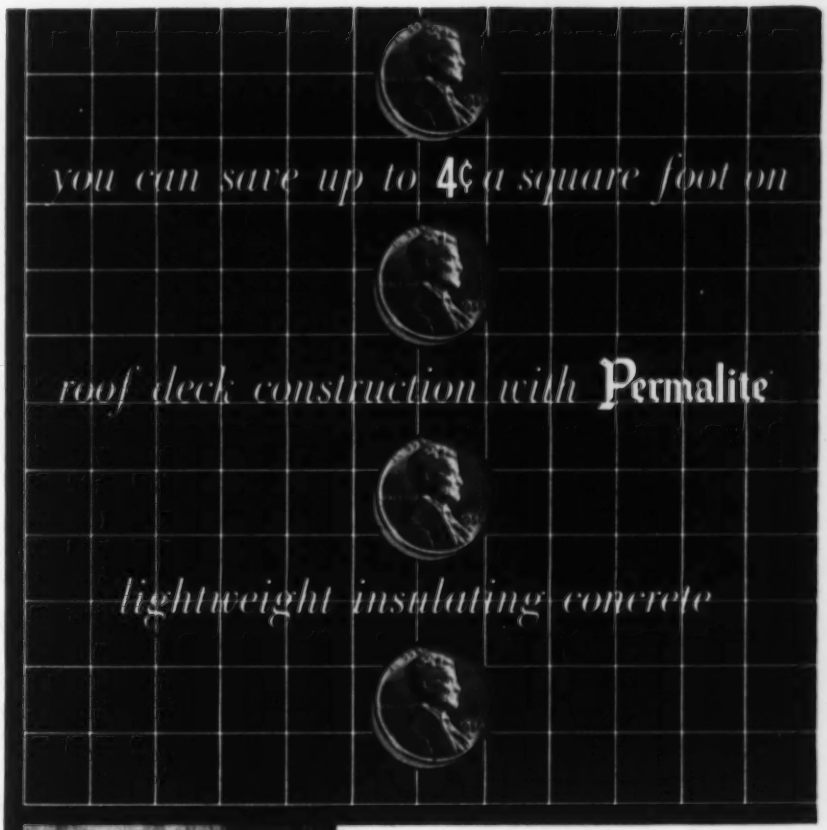

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CLEVELAND TRAMRAIL WAY

MODERN buildings not only have more and larger windows than ever before, but because of air-conditioning, they are often non-opening. This necessitates providing some means for reaching them when washing the outsides, and sometimes for the insides also.

Even where provision is made for reaching the outside of a window from the inside, this usually is not desirable when a building is air-conditioned. Open windows quickly unbalance an air-conditioning system, in warm weather and, of course, are undesirable in cold weather.

Cleveland Tramrail Window Washing Equipment offers a solution to the problem. It enables a man to reach every window quickly and wash them with complete safety. In addition, it facilitates other outside building maintenance such as pointing up, painting, minor repairs. The equipment is available for hand or electric operation.

Write us for free illustrated booklet No. 2022 giving details.

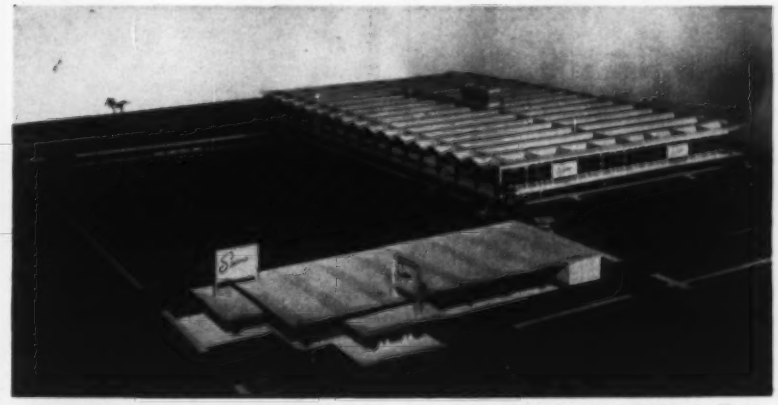
CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

This modern glass-walled office lobby in the super-modern office building of Aluminum Company of America in downtown Pittsburgh is 4½ stories high. Cleveland Tramrail track circles the lobby both outside and inside. A motor-driven carrier and electric hoist is provided for each track loop. When a cage is attached to a carrier, a window washer can position himself at any part of a window by operating the simple hoist and travel controls.

Washing windows on the inside of the lobby. The same cage is used both outside and inside.

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 3221 E. 293 ST. • WICKLIFFE, OHIO



CONCRETE FOLDED-PLATE ROOF in a retail store for Sears-Roebuck & Co. in Tampa, Fla., will have 125 ft spans.

underway on the new slabbing mill. Excavation for the tin mill expansion is now in progress, and ground has been cleared for the oxygen steelmaking plant. Both the oxygen plant and soaking pits are scheduled for completion in 1957, and the overall project, in the summer of 1958.

• **Superior Oil Co.**—A 13-story office building in Los Angeles was virtually completed at the close of 1956. Finishing work remained to be done on some of the interior of top floors, but the 115-ft square, steel-frame structure was expected to be ready in February.

• **Tishman Construction & Realty Co.**—The second Tishman office building to go up on Los Angeles' Wilshire Blvd.—at a cost of $4 million—was dedicated in April, 1956. On the same date, ground was broken for a third similar structure, just a few blocks away on Wilshire. Like the completed building, it will have vertical aluminum louvers on the east and west sides, and horizontal aluminum sunshades on the north and south. The glass windows are now being installed, and the building should be ready for occupancy by February, 1957.

Another two-unit office structure, joined at the ground floor in much the same way as the original Los Angeles 3-unit Tishman office building, erected in 1952, is expected to be started in 1957. Announced in 1955, prior to the upward revision of the 13-story height limit in Los Angeles, as a $10-million. 13 story facility, at least another 7 stories are now anticipated.

Also announced for construction in 1957 is Tishman's first cooperative apartment building in this area. Estimated to cost $10 million, it will provide 108 high-type apartments.

• **Southern California Edison**—This company spent $113 million in 1956 for system additions and betterments, and budgeted an even greater amount, $135 million, for 1957, mostly for steam generating facilities. At the utility's $42 million El Segundo steam station, the second of two 175,000-kw. capacity units was completed and in active operation by the end of August. First unit of the company's $39 million Alamitos steam station, near Long Beach, was placed in service in September, adding another 175,000 kw. A second similar unit at Alamitos, 93% complete at the end of the year, will be ready for use in April, 1957.

A third generating unit, the smaller 10,000-kw hydro-electric Portal powerhouse, in the Big Creek development, was completed at a cost of $2.5 million.

At Redondo Station No. 2 in Redondo Beach, a sixth $20 million unit, with a generating capacity of 175,000 kw, was two-thirds finished in 1956. A $59 million steam station got underway in June in Huntington Beach, to supply Orange County's mounting electrical needs. The design, which consists of two cross-compound, axial flow exhaust, turbo-generators with a capacity of 200,000 kw each, is said to be the first of its kind in steam station construction in the West. The initial two units are slated for completion in 1958, but provision has been made for two more units.

Construction will start in mid-1957 on another new $60 million station, the Mandalay Steam Station located near Ventura, Calif. It is similar in design to the Huntington Beach facility, and both units are expected to be in commercial operation by the end of 1959.

• **Crown Zellerbach Building**—In September, demolition work was started to make way for a $10 million, 20-story, steel-framed headquarters office building in San Francisco. It will have an unusual foundation—a concrete mat 8 ft thick, which makes piles unnecessary. Construction of the building is to get under way by March, and completion is expected by late 1958.

• **Pacific Gas & Electric Co.**—Last year, PG&E completed its $44 million Morro Bay steam plant near San Luis Obispo, Calif., and placed in operation the first unit of $15.3 million Humboldt Bay plant near Eureka. The Morro Bay plant, which operates on desalted seawater, has a capacity of 330,000 kw. At Humboldt Bay, with the first 50,000-kw unit completed, work has started on the second unit, to be in operation by fall of 1958. This company also started work in June on a 165,000-kw expansion of Hunters Point power plant in San Francisco. This $21 million expansion program, to be finished in 1958, was 13% complete by year's end.

• **Los Angeles Water & Power**—Completed during the year was this city department's $81 million Valley Steam Plant in 1956, with the addition of the fourth and final 156,000-kw capacity unit in May. The plant now has a total generating capacity of 512,000 kw. Excavation is well along on another giant project, the department's Scattergood Steam Plant in El Segundo. Actually, construction on the first of two 156,000-kw units is scheduled to begin in February, following completion of the excavation work, which involves removal of over 3 million cubic yards of sand at the 57-acre site, and spreading of the sand along the ocean front. Cost of the first two units is set at $60 million, but four additional units are planned for the future, to bring the plant to a total capacity of 1,200,000 kw. The first of the two initial units is expected to be finished in the fall of 1958, with the second scheduled for service before the end of 1959.

• **Los Angeles Civic Center**—The governmental heart of the nation's third largest city is starting to take on a completely new look with structural work completed on a $20 million county courts building. To be started in 1957 are a $20 million county administration building and a $9 million state office building. The county administration building is across a mall from and will match in size the courts building. Both will be served by a $3.5 million central heating plant that was 20% completed at the end of the year. The county also has under contract a $1 million distribution-pedestrian tunnel serving the heating plant. Garages serving the new buildings may get under way in 1957. Plans are being drawn but financial and operational details are yet to be finalized.

• **Douglas Aircraft**—A new production facility for the final assembly of DC-8 jet transport, was 63% complete at the end of 1956, just 9 months after ground was broken at the 55-acre site in Long Beach, Calif. First plant in the U. S. to be built by an aircraft firm for the exclusive manufacture of commercial jet airliners, it will cost over $20 million. The two main buildings, each 1,144 ft long and windowless, will be illuminated by some 6,000

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The ATLANTIC Pneumatic Pipe Driver is sturdily built for today's improved high speed machines! *Fast* — no delay in coupling additional lengths of pipe — specially designed recess in driving head does not burr pipe.
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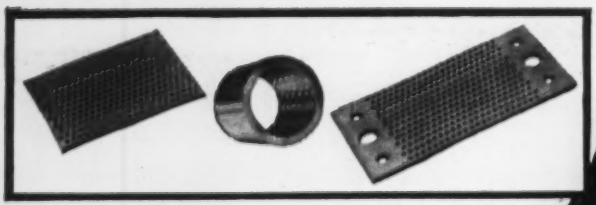

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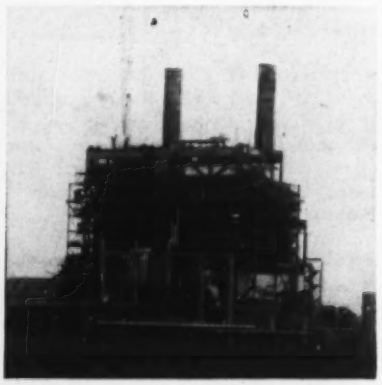
EN-R 1

TIMBER DOME over field house at Montana State College set a new record. It is 300 ft in diameter.

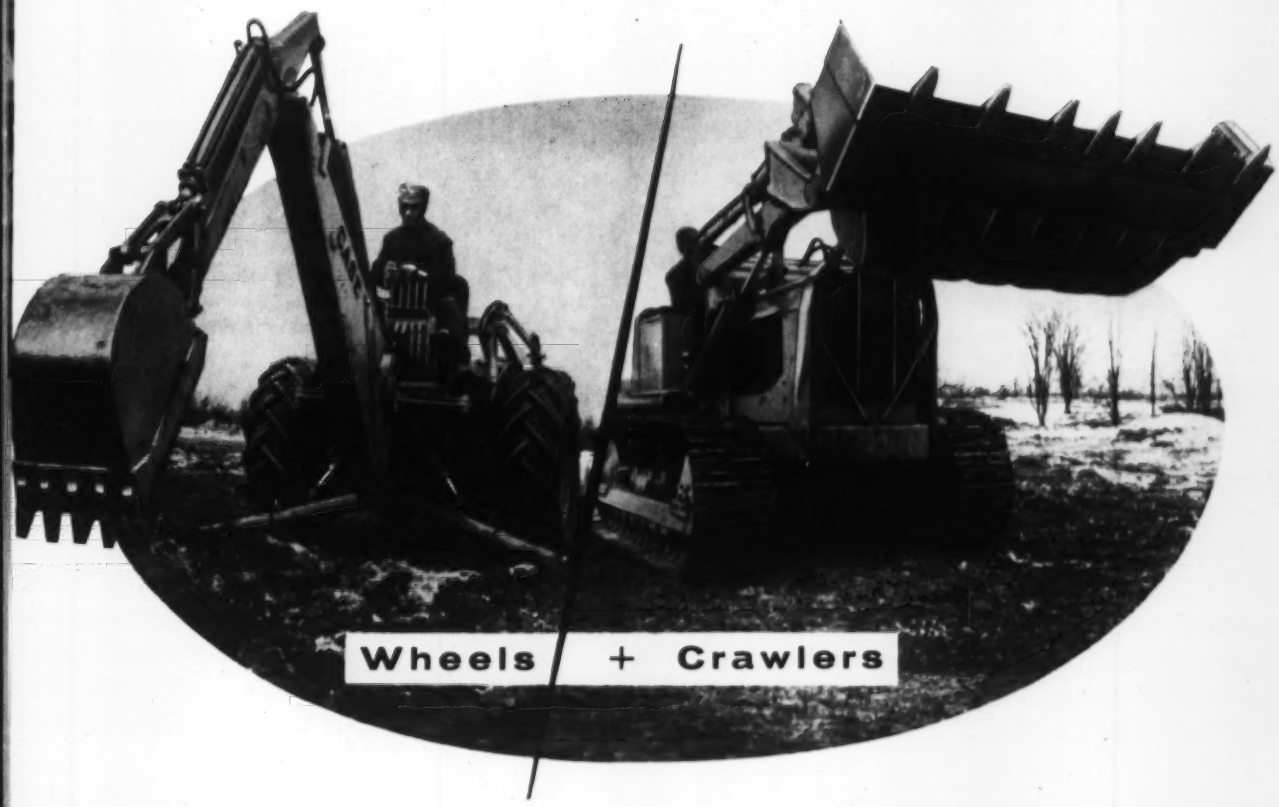


ALAMITOS STEAM PLANT with 350,000 kw capability will be on the line in April.

overhead mercury vapor lights. The largest of the two containing 549,120 sq ft of floor area was 86% completed in 1956, and is scheduled for use in February. The last structural steel work on the second, which covers 411,840-sq ft, was completed late in December. Both buildings will feature corrugated aluminum sheeting for siding. The project also includes three smaller shop service buildings and a paint shop.

• **California State Buildings**—More than $70 million in construction was gotten under way during 1956 by the State of California. Major projects were ward buildings at the Metropolitan State Hospital in southern California at a cost in excess of $5 million and new cell buildings at Soledad State Prison in Northern California at a cost approximating $6.9 million. The 1957 construction schedule calls for starts on $112 million in building projects. Biggest items scheduled to go to bid include a $9 million state office building in Los Angeles; $6.8

CASE + TERRATRAC®



NOW UNITED...to serve you better!

Recent consolidation of Case industrial wheel tractors and TerraTrac crawlers gives J. I. Case Company the *most complete line* of powered earth-moving and materials handling equipment in the 40 to 100 horsepower range. You now have a choice of 20 rugged Case-TerraTrac prime-movers — on both wheels and crawlers — plus over 50 combinations of mounted equipment — *100% Case-engineered, Case-built and Case-warranted.*

Back of this diversified tractor line are the tremendous resources of J. I. Case Company, with its 115-year reputation for dependable equipment, and *over 7,000,000 sq. ft. of modern production facilities.* Case even operates its own foundries, forge shops and engine plants, to insure more closely controlled quality at lowest possible prices.

Service-wise, too, Case is exceptionally well equipped, with in-stock parts and experienced personnel — "on call" through a world-wide network of independent dealers and factory-owned branches.

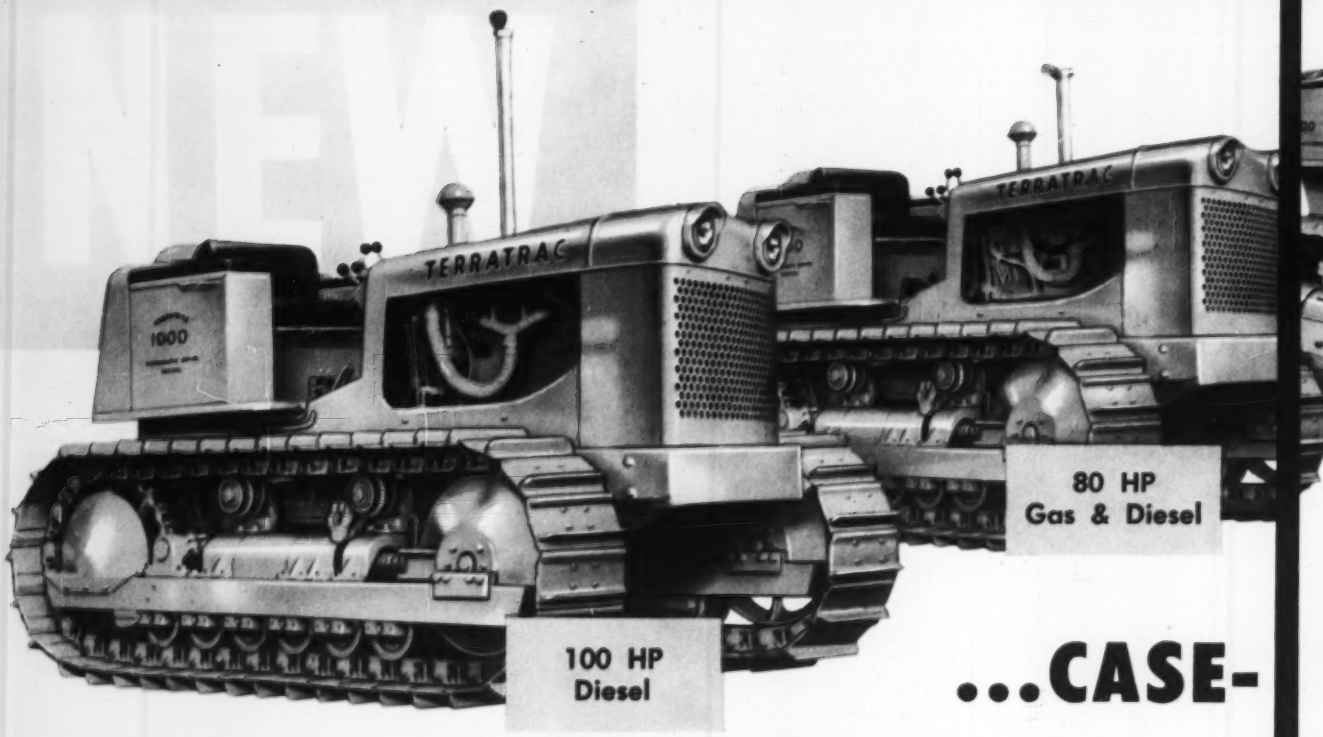
Let your nearest Case *industrial* dealer show you how Case service, combined with the many advanced features of Case industrial wheel-units and TerraTrac crawlers, can *help you handle a wider range of work at higher net profit in 1957.*

CASE

J. I. CASE COMPANY, Racine, Wisconsin, U.S.A.

Famous for quality for over 100 years

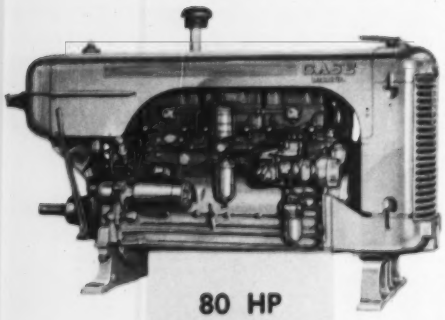
One of the world's five leading producers of powered equipment for construction • roadbuilding • industry • agriculture



80 HP
Gas & Diesel

100 HP
Diesel

...CASE-



80 HP

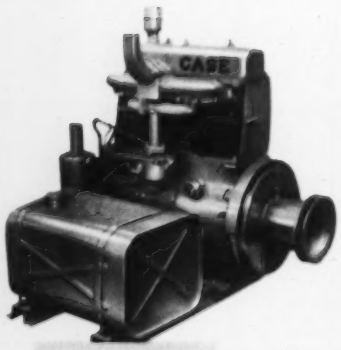
LUCKY is the man who OWNS ONE!

Spearheading the spectacular new Case industrial line are two powerful new *80 and 100 HP* TerraTrac crawlers that promise to change the entire concept of crawler tractor performance on *heavy-duty* earthmoving and materials handling jobs.

Most dramatic advancement in these new big-capacity TerraTrac crawlers is a new *counter-rotating* hydraulic transmission, which provides independent power-control of each track — both as to speed and direction. This *exclusive* patent-applied-for-feature, com-

ENGINES

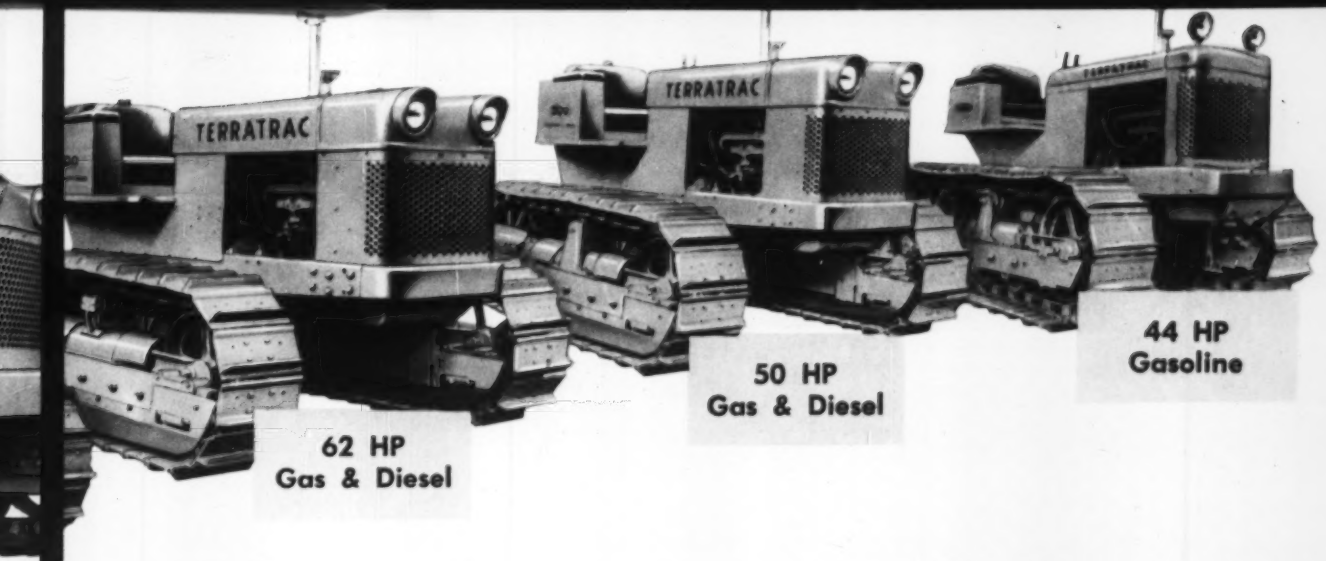
Case also builds a complete line of high-compression, hi-torque engines — from 30 to 80 gross HP, for powering pumps, rock crushers, and other industrial equipment. There's a Case engine for every fuel — diesel, gasoline, natural gas or LP gas.



30 HP

60 HP
Gas & Diesel

OVER 50 COMBINATIONS OF MOUNTED EQUIPMENT —



62 HP
Gas & Diesel

50 HP
Gas & Diesel

44 HP
Gasoline

TERRATRACS® up to 100 HP

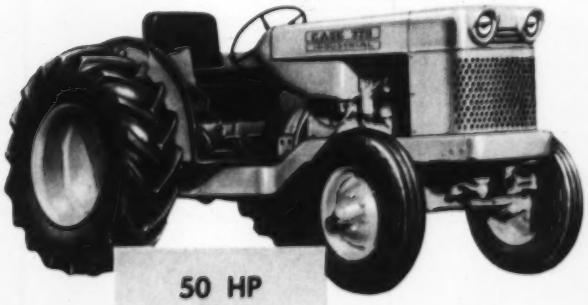
bined with torque converter drive, instant power-shifting, power-steering, power-brakes, automatic track lubrication and torsion-bar suspension, give these rugged TerraTrac machines a combination of power, speed and ease of maneuverability that is *unmatched* in the crawler field.

In heavy-duty rubber-tired tractors, too, Case has taken the lead with three powerful new industrial models, ranging from 42 to 60 HP. *In the low-priced field,* only the Case Model 320 provides shuttle transmission, power-steering, drop-forged front axle, cushioned seat, *plus* industrial bumper and radiator guard. What's more, Case alone offers a *full range of matching equipment* — 100% Case-engineered, Case-built and Case-warranted — to help you handle more jobs, more profitably.

Whether it's the low-priced 42 HP wheel, or the sensational 100 HP crawler, your Case industrial dealer is ready to give the *"best trade in town"— plus 1 to 2-year financing, with easy monthly terms.*

Write today for name of your nearest Case industrial dealer, who can give you the facts and figures you need on these new machines — to take full advantage of the booming construction and roadbuilding market in your territory.

J. I. CASE COMPANY, Racine, Wis., U.S.A.
Famous for quality for over 100 years



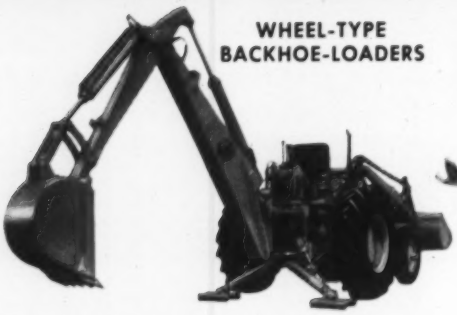
50 HP
Gasoline

42 HP
Gasoline

Printed in U.S.A.

100% CASE-ENGINEERED . . . CASE-BUILT . . . CASE-WARRANTED!

NEW



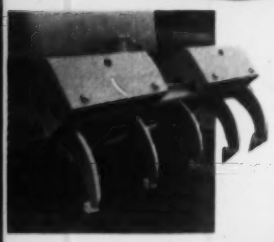
WHEEL-TYPE BACKHOE-LOADERS

UTILITY WHEELER WITH MOWER

CRAWLER-LOADERS
½ to 2-cu. yd.

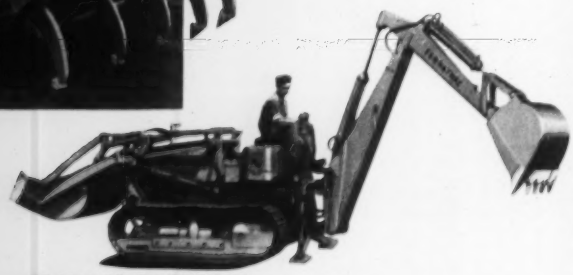
...CASE-BUILT EQUIPMENT

features sensational engineering advances

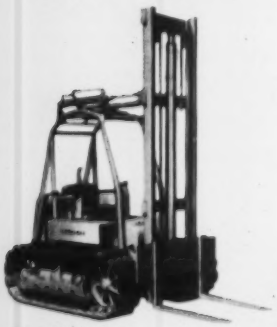


HYDRAULIC SCARIFIERS

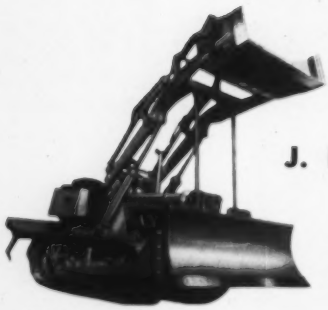
To increase your profit opportunities with the new 40 to 100 HP Case-TerraTrac crawlers and industrial wheel tractors, Case offers over 50 combinations of matching equipment including: new high-dump loaders from ½ *to* 2-*cu. yd.* capacity . . . powerful angledozers that lift and angle *hydraulically* from the operator's seat . . . husky bulldozer blades that lift, tilt and tip *hydraulically* . . . heavy-duty backhoes with hydraulic foot-controlled 180° swing . . . materials-handling fork lifts . . . hydraulic mowers and powerful hydraulic scarifiers. What's more, *all* of this equipment is 100% Case-engineered, Case-built and Case-warranted, exclusively for use on Case-TerraTrac tractors, so you can always depend on "*undivided responsibility*" *in both performance and service.* This is just another reason why it will pay you to standardize on Case-TerraTrac machines — to increase your earnings this year and in the years to come.



CRAWLER-BACKHOES



CRAWLER FORK-LIFTS



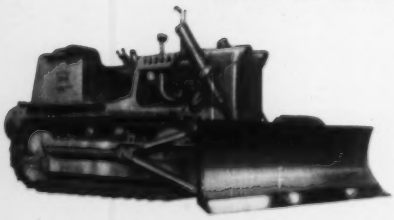
CRAWLER LOADER-DOZER COMBINATIONS

CASE

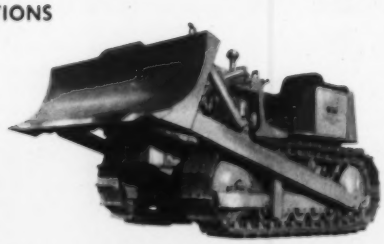
J. I. CASE COMPANY, Racine, Wisconsin, U.S.A.

Famous for quality for over 100 years

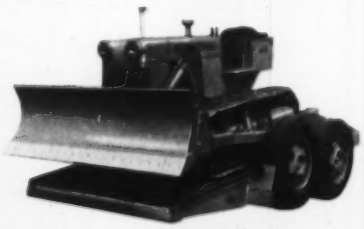
NOTE: Additional equipment, including winches, side-boom cranes and other special tools are currently available for use with TerraTrac crawlers and Case wheel tractors through various independent manufacturers.



CRAWLER-ANGLEDOZERS



CRAWLER-BULLDOZERS



4 AND 8-TON TILT-TRAILERS

CT-CL-2

7 Manufacturing plants . . . world-wide sales and service

million office building in San Francisco and $3 million office buildings in Oakland and Fresno.

• **Boeing Airplane Co.**—Construction was begun on three large projects—a $22 million developmental center at Seattle, a $13 million factory and office building at nearby Renton and a $7¾ million eight-plane hangar, believed to be the largest in the U. S., across the mountains at Moses Lake. All of these projects are scheduled for completion in 1957.

• **First National Bank**—Steel was up to the ninth floor in late December on this 28-story building, which will be Denver's tallest structure on completion in mid-1958. The peak of the tower atop the $15 million building will be 365 ft above street level. Developed by Murchison Bros. of Dallas, Tex., the building will be sold on completion to the merged First National Bank and International Trust Co., Denver's largest financial institutions.

• **Court House Square**—Four underground parking levels have been completed and steel has been raised to the fifth story level of the seven-story, block-square, department-store section of this $35 million Denver development. The department store, to be occupied by Daniels & Fisher Stores Co., is due for completion in the late fall of 1957. Four underground parking levels are finished also for a 20-story adjoining hotel, but no steel has been erected. The hotel will have more than 700 rooms and extensive convention facilities.

• **Petroleum Club Building, Denver**—This $5 million office building for the exclusive use of oil firms will be ready for occupancy by the spring of 1957. The exterior of the 17-story structure is finished with aluminum and glass on three street sides and with brick on an alley side. The Petroleum Club of Denver will occupy the two top floors which command a panoramic view of 150 miles of the Rocky Mountains.

• **Tallest welded building**—Tops in height among welded-frame buildings, the 30-story, 380-ft high (street to penthouse roof) Continental National Bank building in Fort Worth is virtually complete now. About 60% of the 203,000 sq ft of floor space is already occupied. Originally planned with 28 stories, the building was partly erected and then held up because of the Korean War. When construction was resumed, substitution of lightweight materials made possible the addition of two more floors. Completely air conditioned, the structure is enclosed with insulated aluminum-panel walls. Floor construction is cellular-steel decking with 2½ in. of lightweight concrete. The welded frame of the building contains 11 lb of steel per sq ft of floor area. Each ton of steel required 6 lb of welding rods.

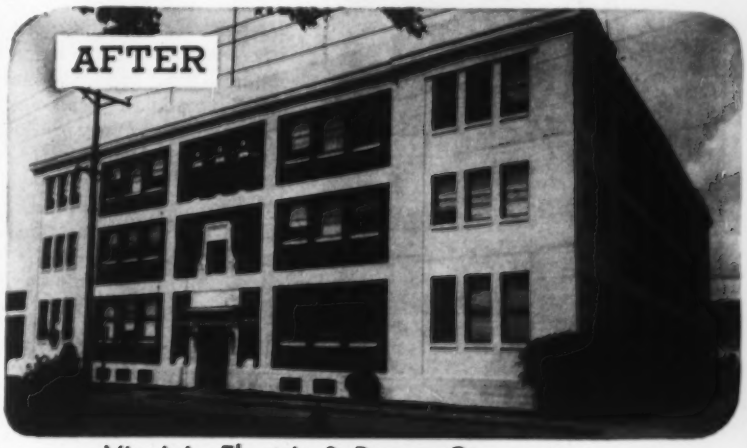
THORITE and THOROSEAL furnish office building with *That New Look* plus all-weather protection.

BEFORE

Severe weathering had deteriorated sections of cornices, sills, lintels and ledges. Cracks permitted water penetration, causing damage to interior of building.

All cracks were opened with hammer and chisel, spalled areas cut and cleaned, then patched with THORITE, followed by two brush coat applications of Pearl Gray THOROSEAL.

Brick was left uncoated to develop pleasing contrast. See Circulars No. 16 and 20.



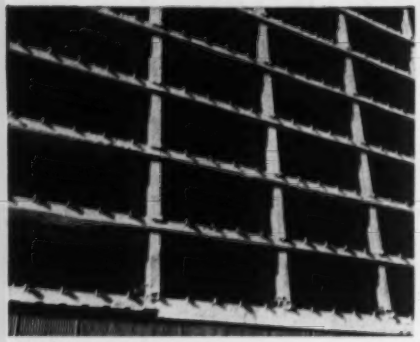
Virginia Electric & Power Company
Richmond, Virginia

THORITE *NONSHRINK PATCH* 20 minute set patching mortar

THOROSEAL *MASONRY SEALER* seals masonry walls against water and beautifies surface

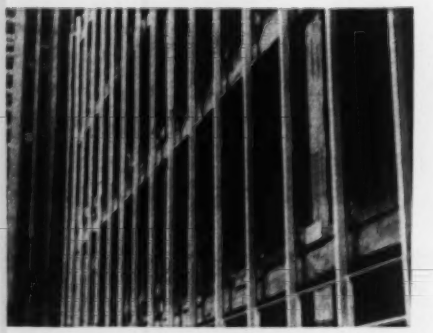
"How to do it" GET OUR 16 PAGE BROCHURE

STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNA. CENTERVILLE, IND.

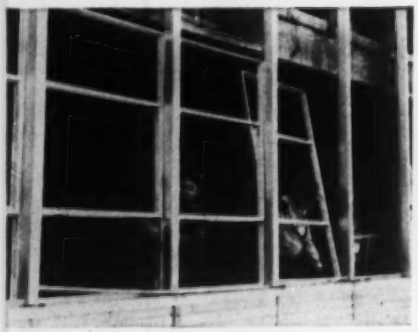


CONSTRUCTION IS FAST, SIMPLE:

First step in the erection of a Lupton Curtain Wall System is the bolting of galvanized steel clips to angle clips fastened to the floor slab or spandrel beam. Angle clips are accurately aligned and welded to the structural frame before concrete is poured.



Vertical mullions of extruded aluminum that act as the "organizing element" of the wall are bolted to the galvanized clips. Slots in the angle clips and galvanized clips allow extremely accurate positioning of the mullions, regardless of structural irregularities.



Here experienced Lupton crew men insert wall units between vertical mullions from *inside* the building, without scaffolding or special hoisting equipment. (They are designed to be installed from either inside *or* out.) Single Lupton contract provides single responsibility for manufacture and installation of curtain wall system.

Lupton Aluminum Curtain Wall System:

LIGHTWEIGHT ALUMINUM WALLS GO

Lupton Curtain Wall Systems offer you: *complete adjustability* to compensate for irregularities in the building frame: *complete moisture protection*, capable of performing satisfactorily in high winds; *efficient insulation* that is equal to or better than conventional construction; *balanced sandwich construction*, to prevent distortion due to changes in temperature; *replaceable panels;* AND a *single responsibility* for manufacture and installation under a single contract with Lupton.

Other notable advantages of the Lupton Aluminum Curtain Wall System include: lower first costs as well as lower maintenance costs. And curtain walls—one-third as thick as conventional masonry—provide a *plus*-dividend in additional square feet on *every* floor.

Unlike conventional masonry walls aluminum curtain walls do *not* pre-empt valuable interior floor space nor add unnecessary weight to the structural frame of the building. Curtain wall fabrication can

Memorial Chapel and Charles Medbury Hall, College of the Bible, Drake University, Des Moines, Iowa
Architects—Eero Saarinen & Associates, Bloomfield Hills, Mich. Contractor—Fane F. Vawter Co., Des Moines, Iowa

UP FASTER, SAVE TIME AND MONEY

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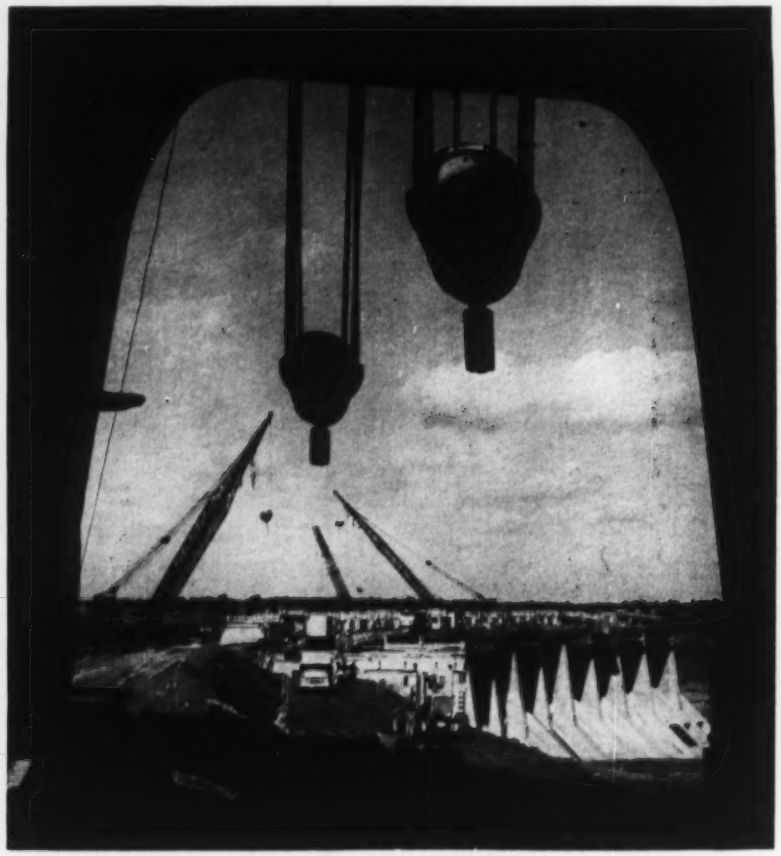


St. Lawrence work (right) is indicative of big jobs, money and technical advances that were plentiful in 1956

Upper Colorado Tops Fruitful Year

Approval of the huge and controversial $760 million Upper Colorado Project topped a year of big doings—big spending and important engineering—in the river use and control field.

It was a year that saw public water resource construction awards continue climbing to $730 million (not including water supply) while private work, mostly hydro, continued at the $300 million plus level it spurted to in 1955. But if the money kept coming, policy didn't. The current Administration's partnership policy remains very much up in the air; no overall national water resources planning policy has been pinned down nor has much progress been made in coordinating the many governmental agencies connected therewith; and the states in 1956 were still but beginning to awaken to their legislative and planning responsibilities.

Stirrings by the state are most encouraging, however. Once state programs are set more generally, they could well spark widespread local construction of water supply, flood control and irrigation structures, which would have dollar impact similar to that of private hydro in the last two years—as California's upcoming program indicates. And Congress, at the President's urging, did produce one important piece of policy legislation—the nation's first flood insurance law which contained surprisingly strong provisions requiring the states to establish flood plain zoning.

Many other individual projects rivaled Upper Colorado for significance and interest last year: successful completion of the key construction year on the St. Lawrence River, start of the Great Lakes and Delaware River dredging programs, letting of the largest single construction contract at Priest Rapids, beginning of record-size locks at Ice Harbor and Wilson Dams, unveiling of California's "grand water plan", and important progress in the Ohio River navigation modernization program.

Technology, too, made significant progress in 1956, more so than in many recent years. The world's first tidal power plant was begun in France, electronic computers were employed importantly in multipurpose project planning and operation, encouraging emphasis was placed on arch dam design, television made its debut in dam construction, first 7½-ft mass concrete lifts were placed in the U.S. and high strength alloy steel was chosen for several scroll cases and penstocks. Finally, completion of the world's first nuclear power plant, in England, signaled the dawn of the atomic era in power—with inevitable effect on hydro-electric construction in the United States.

• **Upper Colorado**—This project, in its initial stage comprising four large dams and more than ten participating irrigation units, is significant for several reasons. The overall basin development program, which could run into several billions, is second only to that in the

Missouri Valley in the U. S. Authorization of just the initial $760 million phase (and a 1956 appropriation of $13 million) is indication of the willingness of the present Administration—and the Congress—to tackle the "frontier" type project, that is, one that opens up a region for great development, where demand is created rather than met.

The project also features Glen Canyon Dam, whose 700-ft height will approach Hoover Dam's present record 726 ft. Like Hoover, it will be a curved gravity structure and will impound 26-million acre-ft of water compared to Hoover's 31 million acre-ft. Incidentally, its silt-catching functions will be important in prolonging the life of Hoover's reservoir, Lake Mead.

• **Purse-strings loosen**—Upper Colorado was indication of a continued high level of federal expenditures for water resource construction. The first two years of the Eisenhower Administration saw a marked holddown on new projects. In the last two years, the Administration has loosened the hold and a Democratic Congress has gone along willingly. Particularly, this past year saw first money voted for Upper Colorado, three big multipurpose dams in the Arkansas River basin, which commit about $1 billion worth of construction, the $150 million Great Lakes channel dredging, the $61 million Delaware River dredging and the $167 million Barkeley Dam on the Cumberland River. The outlook is for a continued high level of federal expenditures for water resources, especially in view of the drought situation in the Great Plains states.

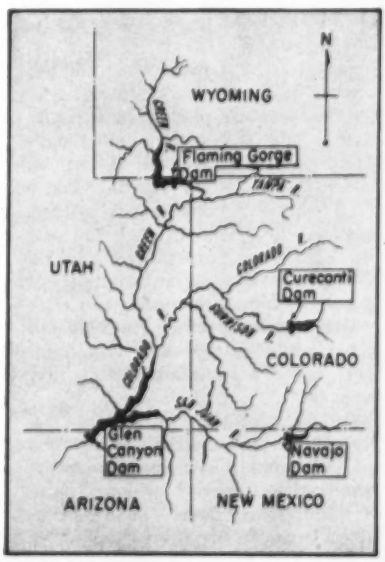
Local government and private money kept flowing in 1956 as major work began at such as the $59 million Swift project on the Lewis River in Oregon, the $85 million Noxon Rapids project on Clark Fork in Montana; the $85 million American River scheme by the Sacramento Municipal Utility District, the $360 million Priest Rapids and Wanapum project on the Columbia and the $176 million, three-dam, Hells Canyon project on the Snake River. In all, resource construction finance by private agencies continued at better than a $300 million a year clip, compared to a less than $100 million pace in 1953 and 1954.

Much of the spurt can be attributed to the facet of the federal government's partnership policy that encourages independent local and private developments. Since federal expenditures for resource construction have picked up to something near pre-Eisenhower levels, it appears that regardless of the other merits of partnership, it has resulted in increased total expenditures for water resource development—and will continue to do so unless modified drastically.

• **Policy debates**—This modification may come to pass. Encouraged by 1956 election results, many Democratic Congressional representatives from the West are becoming increasingly vocal in urging shelving of private projects such as Hells Canyon (Brownlee), Pleasant Valley and proposed partnership development of John Day Dam. Thus far, the Administration has remained adamant in its support of its policy, but there could be some quiet yielding during the current session of Congress.

While the most publicized aspect of the partnership fight centers around the word "giveaway" (or public versus private power) a growing concern over a second aspect, underdevelopment, may result in more subtle change in federal policy. Through 1956, no major partnership project, in the sense of concurrent federal and local or private participation, was begun. To many thoughtful river developers and politicians this is a serious defect of current policy in that it has deprived several local developments of multipurpose benefits that would have been attainable by federal participation.

Again in 1956, hydro power was the tail that wagged the water resources dog; another year went by without an overall water policy being developed. So in the current session the Administration will re-introduce its proposals for an independent board of review for all water resource projects, a coordinator in the White House and for more contribution from beneficiaries of navigation, flood control and irrigation projects. Prospects for action along these lines this year are better than in many years past, the major factors being six years of drought, which have plagued the central plains states from Texas to the Dakotas, and an increasing nationwide interest in water resources.



KEY UNITS of $760 million Upper Colorado River Project.

• **State activity**—At the state level, interest in water resources was never more apparent than in 1956. Although little of concrete nature was produced, a great number of states engaged in preparing master water plans and in drafting clarifications and enlargement of existing water laws.

In California, the water resources setup was reorganized into one department, and a draft of an ambitious multi-billion-dollar plan was released, with approval almost certain in 1957. Although the largest of any non-federal water schemes yet proposed, California's grand plan is indicative of a great surge in river works once the various states arrive at their plans of action.

The bulk of California's plan is to be carried by a state construction agency. It is probable that such construction in other states would tend to be by smaller governmental bodies.

The fundamental of California's plan—long distance transmission of surplus water of one region to relatively arid areas—was to be seen applied elsewhere. Denver in 1956 began construction on its $101 million scheme to deliver more west-slope Colorado River water to the city's domestic supply. And the drought in the Southwest re-focused attention on the Bureau of Reclamation's grandiose plan to divert east Texas water to the Gulf Coast area.

• **Flood insurance**—In the aftermath of the disastrous floods in the northeastern states and in California in 1955, Congress in 1956 passed the nation's first flood insurance law. The law is more a declaration of policy than a blueprint for action since it merely directs the Administration to work with some sort of program. It authorizes the Housing & Home Finance Agency to undertake three related operations: direct federal insurance, reinsurance of private writers, and a loan contract program for reconstruction of flood-damaged properties.

HAFA is concentrating on the direct insurance aspect—up to $10,000 per dwelling unit and $250,000 for any person or corporation is authorized in the federal law, with the premium to contain not more than 40% government subsidy. No actual policy has yet been written.

FLOOD CONTROL construction picked up in a few places last year as a result of big 1955 floods. Shown here is $2 million Rio Hondo Channel, part of $179 million flood control program in Los Angeles.

Flood plain zoning provisions of the new law could be even more significant than the insurance features. After June 30, 1958, the flood insurance administrator is authorized to require that the states enact and enforce flood zoning restrictions where necessary. The current administrator has stated he will not sell any flood insurance in areas not meeting zoning requirements after the specified date in 1958.

Whether this strong and enlightened policy can be carried out is the big question. In many cases, states will have to enact enabling legistlation.

• **Flood construction**—The expected flurry of flood control talk took place after the 1955 floods, and in a few cases was translated into action during 1956. Most notable were starting of five control reservoirs in New England and Pennsylvania just eight months after the floods hit in August 1955, and appropriation of first money for 12 additional starts in this area.

State action tended to concentrate on flood relief rather than control. But a goodly number of states were at last considering some flood control construction independent of the federal program. And flooding considerations were in part responsible for a small appropriation last year by California for surveying and preparatory work for huge Oroville Dam on the Feather River, an important structure in the state's big plan.

• **Key year at St. Lawrence**—It was the key year of construction on the billion-dollar St. Lawrence project—both power and seaway phases—and it ended with work 40% complete and almost all major components on schedule for a 1958 finish. As the debate over partnership policy flourished through the past year, the St. Lawrence project took on added significance as an example of true partnership, with federal and state agencies working together smoothly and effectively and, in this case, with counterpart agencies from another country thrown in.

Most significant construction development was the interesting contrast in U. S. and Canadian concreting methods that unfolded at joint Barnhart Island power dam. The American contractor spread his effort evenly over the monoliths on the U. S. half and concentrated his concreting into the eight warmer months of the year. The Canadians worked all through the year, placed lifts of varying heights and generally concentrated their work to a smaller number of monoliths. Thus, the international dam, offers a singular opportunity to compare these long-discussed differences in dambuilding methods.

Farther up, on the Niagara River, a rockslide on June 7 destroyed two of the three sections of the Schoellkopf station, the principal U. S. power plant at Niagara Falls. Nonetheless, loss of 240,000 kw of generating capacity did not budge Congress into deciding who should develop water made available to this country at Niagara by a 1950 treaty with Canada.

• **Big dredging projects**—Congress did better in initiating construction relating to the St. Lawrence Waterway, as it authorized the big Great Lakes channel deepening project and appropriated $5 million, enabling first contract to be let. The overall project involves 44 million cu yd of dredging between Lakes Superior and Erie at a cost of $150 million. It will create a 27-ft navigable depth through all the Great Lakes,

This graceful five-span structure bridging the Chena River near Fairbanks is 398 ft long and has a roadway width of 30 ft. Owner: Alaska Road Commission, Juneau. General Contractor: Boen-Sealand Constructors, Seattle. Steel was erected by Isaacson Iron Works, Seattle.

How they cut freight costs in building this Alaska bridge

This 398-ft, deck-girder bridge crosses the Chena River at a point near Fairbanks, Alaska. A glance at a map will show you that Fairbanks lies well over 460 miles from port, and the port itself is a long, long journey from Portland, Oregon, where the steelwork was to be fabricated. The Alaska Road Commission understandably preferred to see their money go into the bridge rather than into the cost of transporting it.

For this reason, Fought and Company, steel fabricators, used Mayari R wide-flange beams wherever feasible. With a yield point much higher than that of carbon structural steel, low-alloy, high-strength Mayari R could be employed in lighter sections to lower the deadweight of the bridge components, while assuring the needed strength in the finished structure. The decreased weight resulted in a significant saving in shipping costs.

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This is how the steelwork looked during fabricating stage, in the works of Fought and Company, Portland, Oregon, steel fabricators. Mayari R beams were used extensively to lower weight and cut shipping costs.

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ALGIERS LOCK near New Orleans, opened to traffic last April, provides an alternate between the Mississippi River and the Gulf Intracoastal Waterway.

opening up the entire region to medium size ocean-going shipping. It assures the spending of many port construction dollars by cities and industries along the Great Lakes (and by northeastern Atlantic port cities who must look to their laurels).

The year's other big dredging start, the $61 million deepening to 35 ft of the Delaware River between Philadelphia and Trenton, provided an interesting, and still unresolved, footnote to the Administration's partnership policy. Under it, Eisenhower wants private industry, mainly U. S. Steel Corp., to pay for dredging of the extra 5 ft of depth the latter desires.

Navigation work on another great river, the Ohio, took a long step forward in 1956. As part of a 20-year, $885 million program, new locks have been begun at Markland Dam in Indiana and rehabilitation started on Locks and Dam 41, the worst bottleneck to Ohio River traffic, near Louisville. This was in addition to continuation of substantial work on locks at New Cumberland, W. Va., and Greenup, Ky.

• **Biggest construction award**—Priest Rapids Dam was much in the political news last year, but construction men got more excited over a single $92 million contract awarded for construction of the dam and powerhouse. This is the largest single award ever. And in this day of joint ventures the award to a single contractor, Merritt-Chapman & Scott Corp., made it even more notable.

Helping to swell the contract total was inclusion of turbines and generators in the general contract. U. S. equipment makers objected to this in principal because they believe that such complex work is best performed under prime contract to a specialist, and they objected specifically because an order for the Priest Rapids equipment went to a foreign manufacturer.

• **Record lock lifts**—Two record-lift locks were begun last year, one of 100 ft at TVA's existing Wilson Dam on the Tennessee River and the second of 103 ft as part of the Ice Harbor project on the Snake River in Washington. For TVA, the $35 million lock marked the first major river start since South Holston Dam, which was completed in 1951. And in the Pacific Northwest, the $135 million lock and dam project is the first federal start since Dalles Dam (now nearing completion) was begun in 1952.

Size of the single chamber locks, 110x600 ft at Wilson and 86x675 ft at Ice Harbor, in conjunction with the record lifts, created filling and emptying problems of unprecedented magnitude. Extensive hydraulic model studies in both cases provided most of the answers and a lot more knowledge of general application in this field.

• **Pumped storage**—TVA last year also placed in service the world's largest pump-turbine at Hiwassee Dam in North Carolina. It is a 102,000-hp

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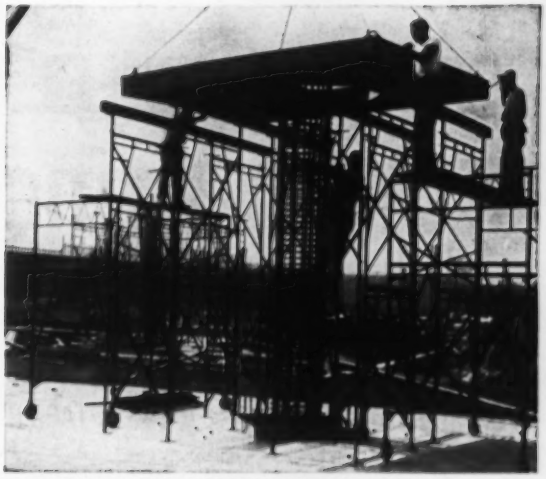
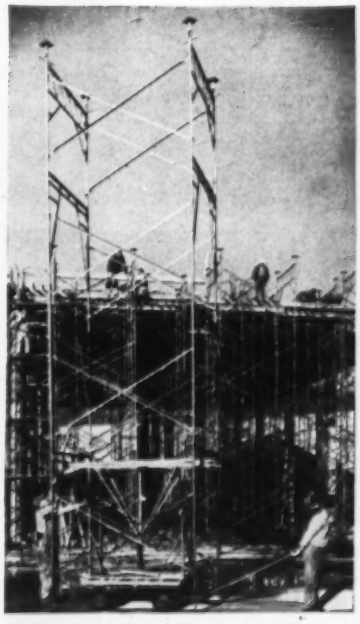
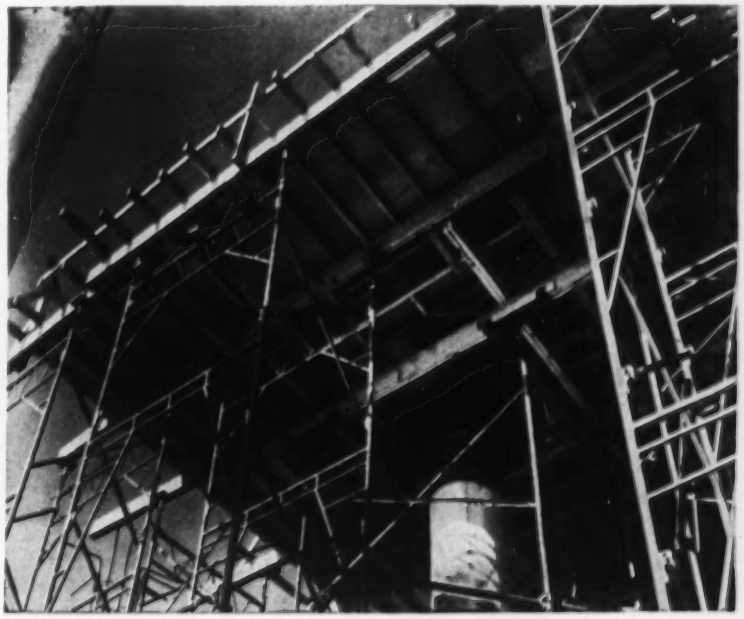


ROLLING SCAFFOLDS AID SHORING—"Trouble Saver"® Sectional Scaffolds make platforms for workmen guiding "prefab" drophead form being lowered by mobile crane onto 4x6 stringers. Donald F. Shaw uses this mechanized system on 3-story, 556' x 250' United Parcel Service bldg., Los Angeles. More than 2,700 "Trouble Saver" Shoring frames support formwork for 3" waffle-type floors.



DOLLY ASSIST—PS Co.-developed hydraulic, wheeled dollies speed the movement of entire prefabricated sections of "Trouble Saver"' Shoring to successive pours on this huge 291' i.d. concrete reservoir at Reading, Pa.



RESERVOIR SHORING—"Trouble Saver" Sectional Shoring frames support cantilevered, double 2" x 8" stringers around drop head under concrete slab for the same reservoir reported, left, on which B. F. Ziegler Construction Co. is the general contractor. Curved dome varies from 28' to 31' high. Assembled shoring sections are moved to new pour locations on PS Co.-developed hydraulic, wheeled dollies, and by caster attachments, similar to those shown in the photo above.

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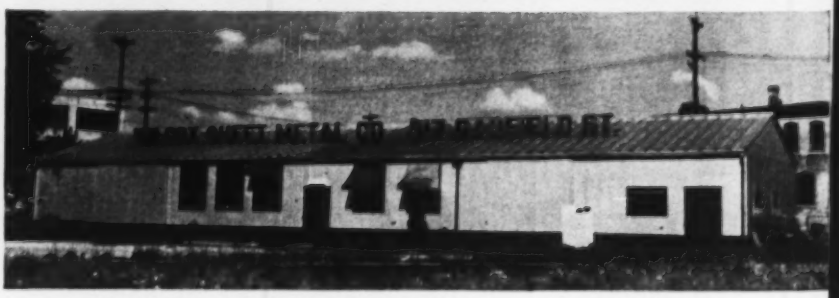

After 23 Years' Service: Armco Culvert Dug Up, Extended, Reinstalled

Picture shows a length of 60-inch-diameter Armco Corrugated Metal Pipe after 23 years' service under a highway in northern Illinois. Condition of the pipe was rated as excellent. This Armco Pipe, along with other sections uncovered at the site, was reinstalled with additional lengths of new pipe to handle drainage under a wider roadway. Thus durability, combined with important ease of adaptation, provided extra service life.

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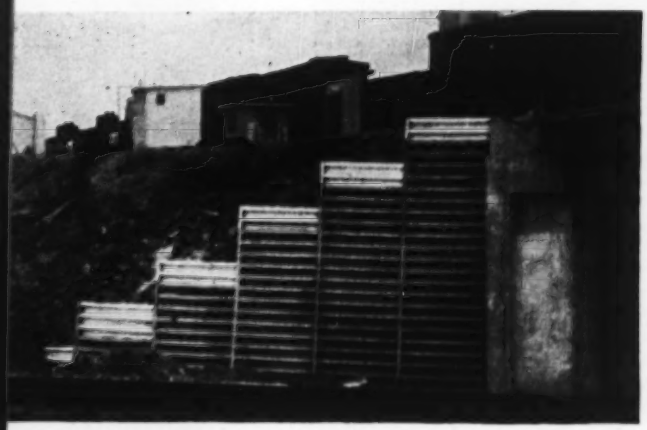

Needed Higher Wall: Extended Top With Standard Parts

Erected in 1954 as a combination retaining wall and wing wall for a railroad bridge, this Armco Bin-Type Retaining Wall was extended 2'-6" in 1956. Light colored area at top of bins is the addition. Job was simply a matter of ordering and assembling the required standard parts. All connections are bolted. Thus the addition becomes a strong, integral part of the original structure.

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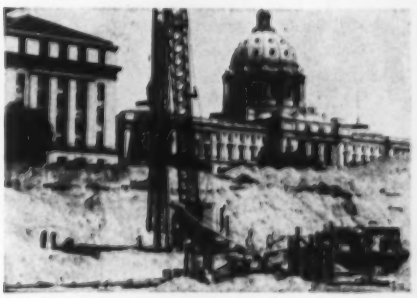

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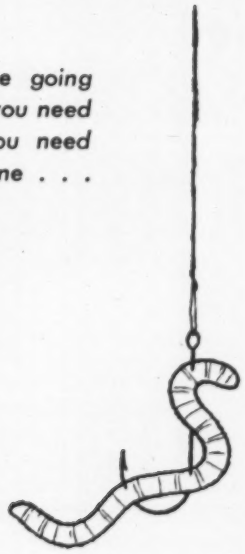

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pump which when reversed becomes an 80,000-hp turbine. Thus far, the main application of pumped storage has been in Europe, but as rivers become more fully harnessed in the western hemisphere pumped storage schemes are likely to become more popular. The Canadians have a major installation under way at Sir Adam Beck II Station on the Niagara River. If the U. S. development on the Niagara at Lewiston is consummated as planned, it also will include pumped storage.

• **Tidal power**—Man's long-time dream of utilizing the power of tides to generate electricity started to become a reality in 1956 as the French began a $100 million, 342,000-kw installation across the Rance River estuary on the Brittany coast. A new and small horizontal-axis turbo-generator, able to generate during both ebb and flood tides, was developed to make the project economically feasible. Thirty-eight of these 9,000-kw units, which can double as a pump to increase available head, are to be installed in a 2,300-ft hollow dam to produce some 800 million kwh a year.

Highest tide in the Rance estuary is an attractive 37 ft. The world's largest tidal range, 52 ft, occurs in the Bay of Fundy area between Canada and the State of Maine. Here the U. S. began and abandoned the so-called Passamaquoddy tidal power scheme in the 1930s, using only U. S. waters (Cobscook Bay) where the tides range only 24 ft. Now the U. S.-Canadian International Joint Commission and the Corps of Engineers is investigating a true Passamaquoddy project using both Passamaquoddy and Cobscook Bay pools.

• **Electronic computers**—During 1956, electronic digital computers unobtrusively became truly significant tools of river developers. The most sophisticated application was by the Missouri River Division of the Corps of Engineers, which successfully completed a set of instructions by which optimum yearly river regulation and power generation schedules on the Missouri River reservoir system can be automatically calculated for any basic set of assumptions. The idea is that an overall improvement in performance of only 2%, made possible by better answers from the computer, is worth more than $1 million a year. For the Ohio River, the Corps experimented with a computer program to determine just how large a flood could occur if conditions were at their worst.

Backwater curves for the International Rapids section of the St. Lawrence River were determined by an electronic digital computer at the University of Toronto. Surges in pressure tunnels are computer-calculated by Ontario Hydro-Electric Power Commission at its Niagara Falls station. And at Harvard University, a special water resources seminar started last September to refine present techniques of analyzing benefits of multipurpose, multiproject river developments utilizing linear programming methods and electronic computers.

These applications cover a wide range, which undoubtedly will be extended to structural analysis itself. There is little doubt that electronic computers, particularly the digital variety, will be given ever wider application in river work with resultant savings in manpower and design time and, most important of all, because they give better answers.

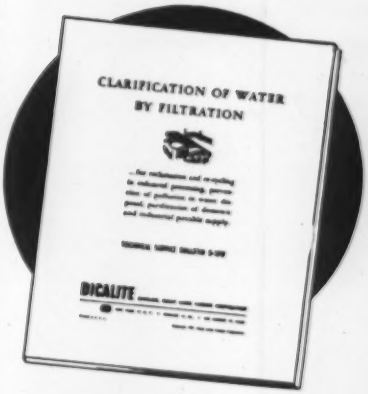
• **Arch dams popular**—Arch dams for the U. S. received significant impetus during 1956—from Swiss and Italian structures of unprecedented heights, from Portugal's success with model analysis, and from a special symposium on arch dams held at the American Society of Civil Engineers meeting in Knoxville, Tenn., in June.

In years past, American engineers played a leading role in the arch dam field, but, of late, European innovaters have made the real advances. Whether the paucity of recent arch dams in the U. S. is due to the onerous design task required is a moot question. But it appears likely that intelligence from abroad in the form of model analysis, and simplified methods of rational analysis, will encourage U. S. engineers. If not this, then the bold designs of the French (6-ft thickness on a 125-ft height at Gage), of the Swiss (780-ft-high Mauvoisin under construction) and of the Italians (875-ft-high Vajont Dam started last June) may spur our experts on to new conquests.

At this time, two high arches are planned for this country. Bureau of Reclamation has an arch of 520 ft under design at the Yellowtail site in Wyoming, and Ebasco has planned one of 534 ft at Pleasant Valley on the Snake River for a group of northwest utilities.

The Bureau of Reclamation has announced that an even higher dam at Pleasant Valley—170 ft higher and presumably an arch—is economically justified and technically feasible.

• **TV looks good**—Television proved itself a valuable aid in river construction in a couple of striking applications this past year. At Table Rock Dam in Missouri, in a cableway operator's control booth located over the bucket



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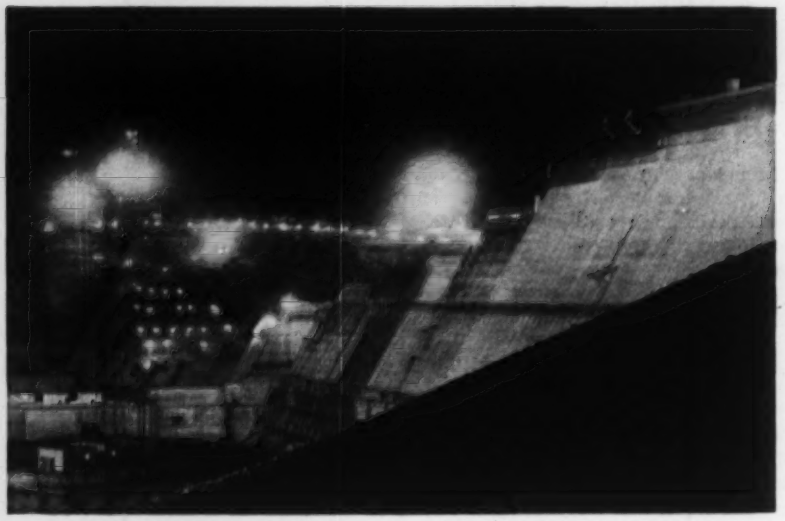

TABLE ROCK DAM on the White River in southern Missouri is scene of new ideas: 7½ ft concrete lifts, TV for cableway control.

pickup point, a TV screen provides a view of the cableway sheaves a half mile away on a stationary head tower. Thus the operator can be stationed at the most efficient point and still coordinate accurately travel and lift of the buckets.

At the St. Lawrence project, television gives an office view of distant operations and permits close observation of blasting work from a safe distance.

TV was also employed earlier at the Dalles Dam for viewing foundation conditions underwater.

• **Higher lifts**—Table Rock provided another innovation for the U. S.: the contractor appeared to be quite successful in placing mass concrete in 7½-ft lifts, in this contract to the near U. S. standard of 5-ft lifts.

The higher lift is resulting in a third less from handling, but requires more rigid and more expensive forms to resist deflection. It is difficult to judge now how widespread this practice will become.

Another notable technical advance in 1956 was the use of high-strength alloy steel in fabrication of scroll cases at three major hydro projects, Brownlee, Noxon Rapids and Swift Dams. Working stresses double those used for common flange grade steel allow reductions in plate thickness which are partly, but not wholly, offset by higher cost of the alloy and special welding techniques required. Recently it has been learned that penstocks for a major dam are to be lined with this high strength quenched and tempered metal.

• **Atomic power**—A review of the river control field would not be complete without noting the starting up of the world's first nuclear power plant at Calder Hall in England and its possible effect on hydro works. Dawn of the nuclear age coincides with the decreasing availability and relative use of water power in Europe and the U. S., as reflected in lower percentages of national electrical generation totals.

There is little doubt that hydro development in the U. S. will be completed at some point short of the maximum potential of its rivers because of economic factors. For example, the Columbia River basin is capable of 32 million kw but only 20 million kw appears likely at this time.

Atomic power will not necessarily further reduce the likely development. Rather nuclear plants could make additional hydro works economically justifiable by being coordinated in water schemes as a cheaper method of increasing firm load than building a higher dam. While much the same coordination is possible between conventional steam plants and hydro, nuclear power's great advantage is its fuel. Location of a nuclear plant is not particularly tied to its fuel source for the latter can be transported anywhere at negligible cost compared to fuel for conventional steam plants.

The above assumes that cost of nuclear power is competitive with conventional thermal power. This is likely within a shorter time than realized by most. Great Britain's first commercial nuclear plants, based on the Calder Hall prototype, are expected to produce at between 5 and 8 mills per kwh.

Major River Use and Control Projects

• **Columbia River**—Most dramatic Columbia River construction news in 1956 was closure of the river in October at the $260 million **Dalles Dam.** First two generators are slated to go on the line in November, 1957. Work funds of $42.5 million in 1956 here were more than half the funds expended on Corps of Engineers projects in the Columbia basin. Completion of the non-overflow rockfill closure, between the Oregon bank and the east end of the powerhouse, is slated for August, 1957. River navigation had been halted via the old canal, and the new navigation lock, 93% complete, is to be open for traffic in April. Powerhouse work was ahead of schedule, with concrete placement for units 4 to 13 and installation of embedded turbine parts, units 6 to 11, in progress. The total project was rated 61% complete.

McNary Dam—This $286 million Columbia River project of the Corps of Engineers is virtually complete with final generators placed in service in 1956.

Priest Rapids Dam—Award of a $92-million contract in mid-1956 started construction on this dam on the Columbia. The 630,000-kw hydroelectric project is being built for Grant County PUD with financing by revenue bonds backed up by firm contracts for sale of a substantial portion of the power to 12 other public and private utilities. Powerhouse cofferdam is complete and the area is being pumped. Construction of the powerhouse will begin in April with 40% completion expected in 1957.

Rocky Reach Dam—Work was begun in the early fall on the first $25-million phase of Rocky Reach Dam on the Columbia River for the Chelan County PUD of Wenatchee, Wash., with construction of a cofferdam. The entire project is expected to cost 250 million, with completion scheduled for 1962. Contract for the second phase is due for award in 1957.

Chief Joseph Dam—Energizing of three 64,000-kw units made this Corps of Engineers Columbia River project 90% complete at year's end. Now in place are 7 generators in the 2,036-ft-long powerhouse designed to house 16 units in the initial phase of the $200-million project. Final power delivery is slated for late 1958.

• **Snake River**—At the **Hells Canyon** location, preliminary work has begun on **Oxbow**, second of Idaho Power Co.'s three-dam complex on the Snake River. Road work and plugging of an old railroad tun-

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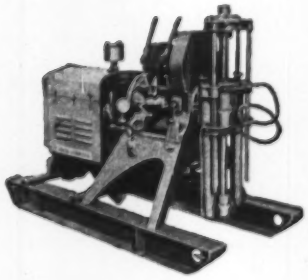

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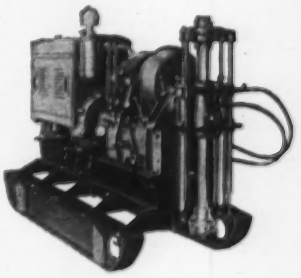

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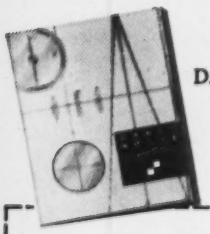

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GLEN CANYON DAM on the Upper Colorado River should look like this several years from now. It's to be a 700 ft high curved gravity structure.

nel are under way. The initial structure, **Brownlee**, is one-third completed. Excavation is down to 120 ft below normal riverbed and grouting has been nearly completed. Powerhouse excavation is 75% complete, and next step will be penstock-lining. Idaho Power has spent more than $12 million on this project to date in construction work alone, not including machinery or equipment.

Ice Harbor Dam—This lower Snake River project of the Corps of Engineers was just getting started, after more than a year of preliminary work, with dewatering of the 17-acre area behind the south shore cofferdam getting under way in December. Rated only 4% along, the $135-million project will move into higher gear in 1957 with first-stage construction bid at $29.5 million late in 1956. This will include the powerhouse skeleton structure, spillway bays and left bank abutment fill. Initial capacity will be 270,000 kw.

Palisades Dam—Bureau of Reclamation reports first power from Palisades, on the Snake, will be ready for use early this year. Total installed capacity will be 114,000 kw when all four units are on line. Another year remains before work of getting Palisades fully operative will be completed.

Clark Fork River—Washington Water Power Co. will award the balance of construction contracts in 1957 for its **Noxon Rapids Dam.** The first of 400,000 kw will be on the line in 1959. The Noxon Rapids Dam, 23 mi upstream from Cabinet Gorge, was 25% complete in 1956. The northwestern Montana project will require a 3 million cu yd earthfill and 500,000 cun yd of concrete to complete a 57000-ft-long concrete spillway and earthfill wings. During 1956, reservoir clearing was started, turbines and generators were purchased, and actual construction of the spillway section was started on the $87-million project.

• **Lewis River**—At Pacific Power & Light Co.'s **Swift Dam** site in Washington. The river has been diverted through a 2,900-ft-long, 32-ft-dia tunnel, foundation excavation was completed, power tunnel work was under way and sheetpiling was being driven for the cut-off for the main structure at year's end. Designed to be the world's highest earthfill dam, it will raise 510 ft above foundation excavation, reach 2,100 ft across the river gorge at its crest and be a third of a mile thick at its base. The $56-million project is to develop 256,000 kw of capability, of which 70,000 kw is assigned to a downstream phase to be undertaken by neighboring Cowlitz County, Wash., PUD.

• **Cowlitz River**—Work on Tacoma City Light's (Wash.) **Mayfield Dam** was hampered considerably by legal troubles which were awaiting a decision from the state supreme court at the end of the year. Contracts totaling $17 million have been awarded for the dam and associated 40,000-kw power plant. Work has included a tunnel, 800 ft long, from the proposed reservoir to the powerhouse. The dam is a 185-ft-high concrete arch with gravity wings.

• **Upper Baker River**—Contract was awarded and work started on Puget Sound Power & Light's new hydroelectric dam on the Upper Baker River near Concrete, Wash., estimated to cost a total of $35 million. The project, to increase the capacity of a downstream plant, is due for completion in late 1959. A $3 million expansion of the company's **Snoqualmie Falls** plant is scheduled for completion May 1.

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Major River Use Projects

• **Green River (Wash.)**—Bid early this year were rockfill dam, spillway and outlet works for **Eagle Gorge Dam**, $23.1-million Corps of Engineers flood control project in Washington. Completion is slated for 1959.

• **Willamette River Basin**—Diversion tunnel for the Corps of Engineers **Hills Creek** dam on the Middle Fork of the Willamette River (Ore.) was holded through in late December as this $34.5-million project, started in 1956, reached 5% mark. Logging of the dam site area of 421 acres was almost completed. First power from 30,000 kw is due November 1961.

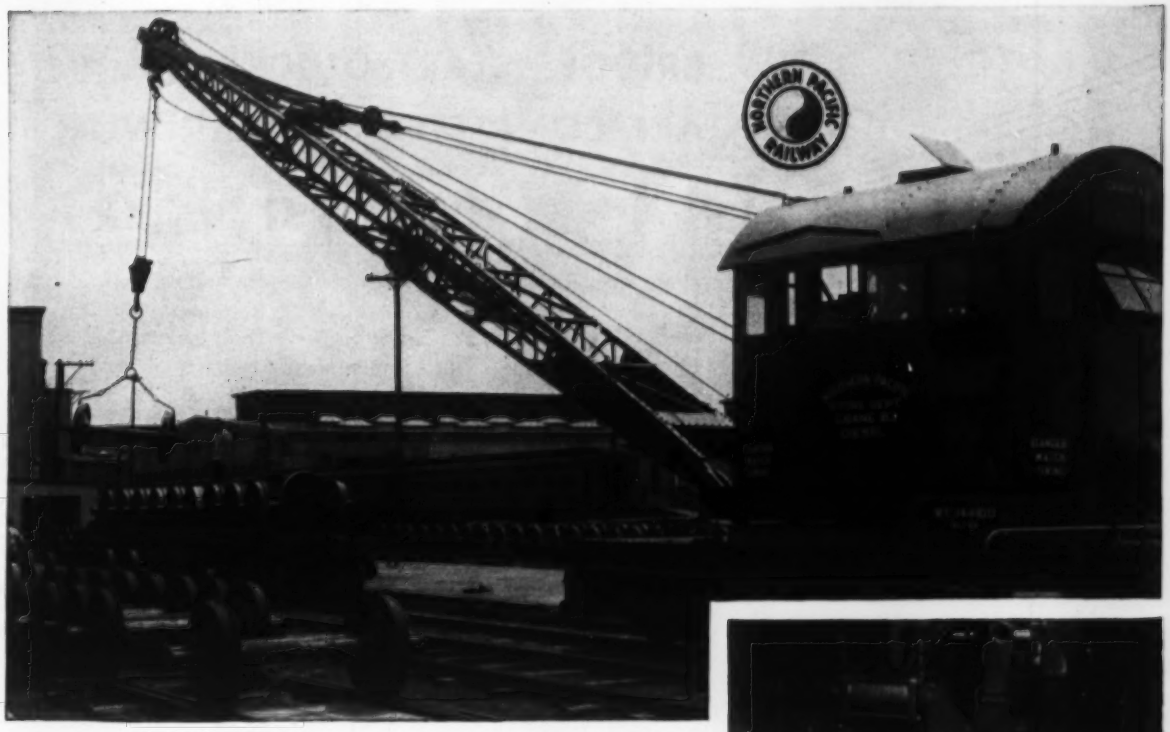
Progress at the **Couger project**, another Corps unit, was at 3%, with the diversion tunnel due for completion in March. This $37.4-million dam on the south fork of the McKenzie River will also have 25,000 kw of capability and is scheduled for completion November 1960.

Engineering design is also advancing on **Green Peter**, a $58.4-million project, and **Holly**, a $12.5-million dam, both in the Willamette basin.

• **Columbia Basin Irrigation**—The Bureau of Reclamation's largest irrigation project is continuing to expand its canal system. Construction in 1956 was mainly lateral systems and pumping plants to serve 56,000 acres of newly irrigated land and the start or continuation of systems to deliver water to an additional 47,000 acres in the spring of 1957. In September a contract was awarded for construction of the 15-ft-dia, 3-mi Wahluke siphon, to be completed in 1958, and bring water to a potential 100,000 acres on the south slope of the Saddle Mountains. Irrigation contracts in force in 1956 totalled $25 million, and the year's earnings on them was approximately $8.6 million. The construction program for 1957 will total $19 million, including eight to ten new major contracts for construction of lateral systems to serve acreages scheduled for development in 1958 and 1959. Irrigation water will be available to a total of 348,000 acres in 1957.

• **Columbia River Navigation**—Dredging of the ocean-shipping channel entrance to a depth of 48 ft, passed the halfway mark in 1956. Starting in April, the Corps' dredge Biddle had moved 14 million cu yd of material when work was suspended in the late fall, to be resumed later during the spring. Completion of the total 19 million cu yd of dredging is scheduled for October, 1957.

• **Skagit River** — Construction continued throughout the year on a $17-million diversion dam on the Skagit River at **Gorge**, with completion scheduled for 1959. The dam, being undertaken by Seattle City Light to replace an existing low dam, will add 47,000 kw to the capacity of the Gorge power plant. Work was completed on in-



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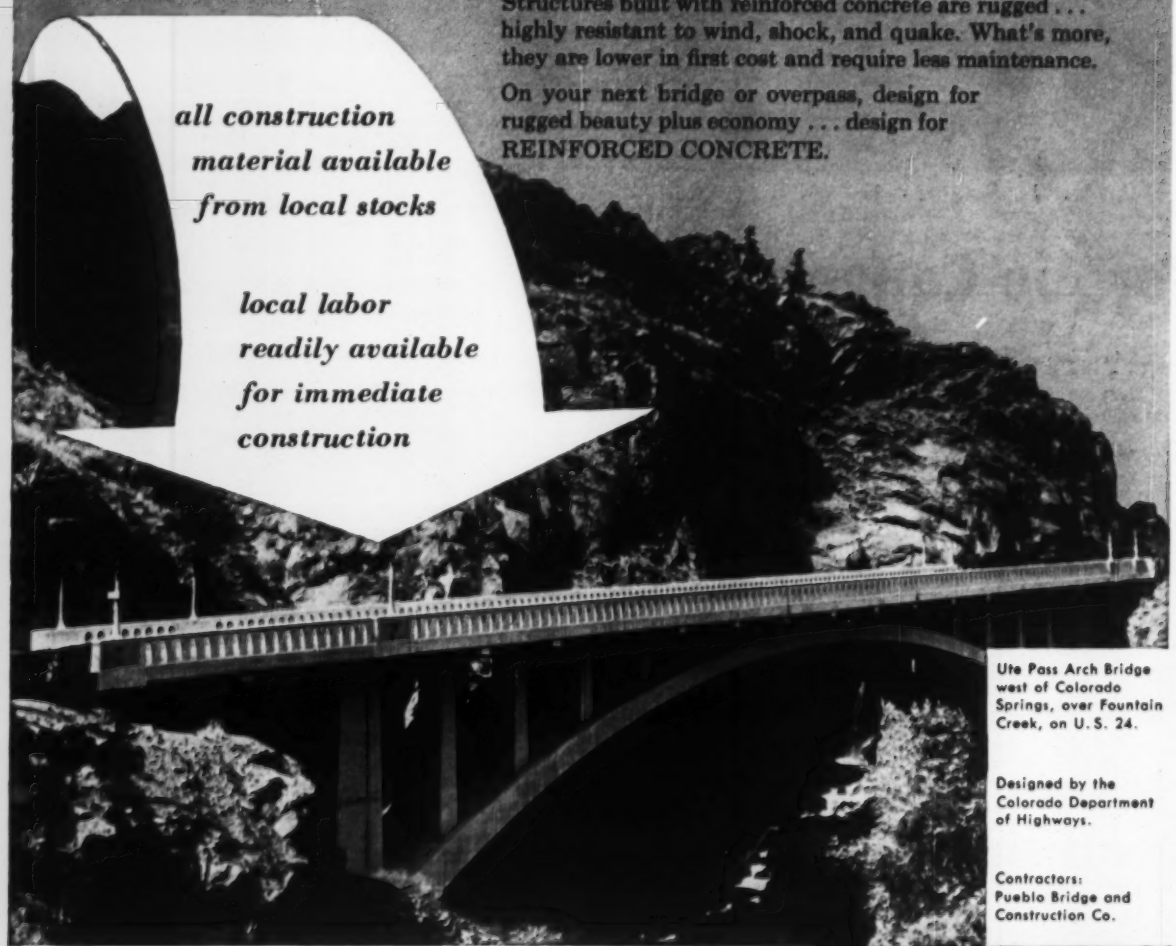

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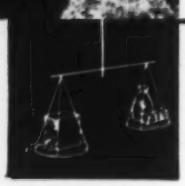

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stallation of a fourth 90,000-kw unit in the **Ross** powerhouse at a cost of $6 million.

• **Deschutes River**—Portland General Electric listed its $25 million, 120,000-kw **Pelton Dam** project in Oregon at the 30% mark at year's end. Contractors have completed most of the excavation. Placing of concrete for the 203-ft arch dam touched 21,000 cu yd of the total 95,000 cu yd slated for the main dam, the powerhouse and a re-regulating dam downstream. Completion of the project is dated for March, 1958.

• **Northern California Flood Control**—The Sacramento District, Corps of Engineers, spent a busy year fixing levees damaged by storms in December, 1955. The District spent about $15 million repairing levee breaks in the Sacramento and San Joaquin Valleys and another 3.5 million on its regular Sacramento River Flood Control Project work. Major jobs were restoration of the Feather River channel at the Yuba City and Nicolaus breaks.

Construction was completed on the Bureau of Reclamations $65-million **Folsom Dam** on the American River 20 miles north of Sacramento in May.

• **Sacramento Deep Water Channel**—The Corps of Engineers resumed work on this $35-million project idled by the Korean War. The first work was a $2.2-million dredging contract. Bids will be let during 1957 on various other phases of the project which bring California's capital city to an inland port status.

• **Central Valley Project**—Bureau of Reclamation continued work on the Central Valley Project in California which in 20 years has occasioned total expenditures of $520 million. Emphasis has swung to a new phase of the work, the $225-million **Trinity River Project** located in northern California.

In December the Bureau received a low bid of $36 million for construction of the **Clear Creek Tunnel.** This Feb. 5, low bid of $48.9 million was received for construction of the main **Trinity Dam.**

During the year a contract was let for the Trinity diversion tunnel, bypassing the river around the main Trinity damsite, and by year's end the $1.5-million tunnel project was 60% complete. Work advanced to 25% of completion on the $2.5-million Trinity community facilities that are being built to house USBR and other Trinity division workers.

In 1956 the first reach of the $6.9 million **Corning Canal,** a unit of the **Sacramento Valley Canals** was completed, and the last 8-mi section of the 26-mi canal advanced to 80% completion. The first water users contract was signed, and it is expected to set a pattern for other repayment contracts, assuring starts on the **Tehama-Colusa** and **Chico** canals and **Red Bluff** diversion dam on the Sacramento River.

In the lower **San Joaquin Valley** the CVP water distribution system costing about $60 million advanced to 80% completion.

• **Solano Project—Monticello Dam,** key unit of the $51-million Bureau of Reclamation Solano project in northern California, was 90% complete. Overall, the Solano project was 64% complete. The **Putah Diversion Dam** was 20% completed, and work was finished on the first 6-mi section of the **Putah South Canal.** Work advanced to the 3% stage on a 12½-mi section of the canal and bids will be received this spring on a 9-mi section, followed up later in the year by bids on the final 10-mi strip.

• **Cachuma Project**—The Bureau of Reclamation brought to within 99% completion the $43-million Cachuma project which supplies water to California's Santa Barbara region.

• **Santa Maria Project**—Bureau of Reclamation let a $6.2-million contract for construction of **Vaquero Dam,** key unit of the Santa Maria project in California's central coastal area. At year's end the dam was 9% complete, and the $17-million project as a whole advanced to the 12% completion stage.

• **Ventura Project**—This is Reclamation's newest California project and it is expected to cost 27.6 million when completed. It will supply water in California's Ventura County. During the year the Bureau let a contract for construction of the $8.6-million **Casitas Dam,** major unit of the Ventura project, and at year's end it was 2% complete.

• **Tri-Dam Project**—This $42-million project on the middle fork of the Stanislaus River in eastern California now is expected to be finished by late 1957, a year ahead of schedule. The dams are being built by Oakdale and San Joaquin irrigation districts to provide storage space for 230,400 acre-ft of irrigation water and to develop 81,000 kw of power. With excellent construction weather in late fall and early winter, work was virtually completed on the 280-ft high, 3.3-million cu yd, earthfill **Beardsley Dam. Donnells Dam,** a thin arch rising 290 ft above stream bed level with a 200-ft-deep foundation excavation, also benefitted by the good weather. Concrete had risen 100 ft above the foundation plug. At **Tulloch Dam,** last of the three to get started, progress was also good on its 230,000-cu yd concrete gravity section.

• **Coyote Dam Project**—Excavation is under way at this Corps of Engineers $18 million project on the Russian River near Ukiah, Calif. Scheduled for completion by 1959,

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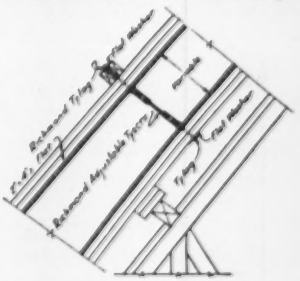

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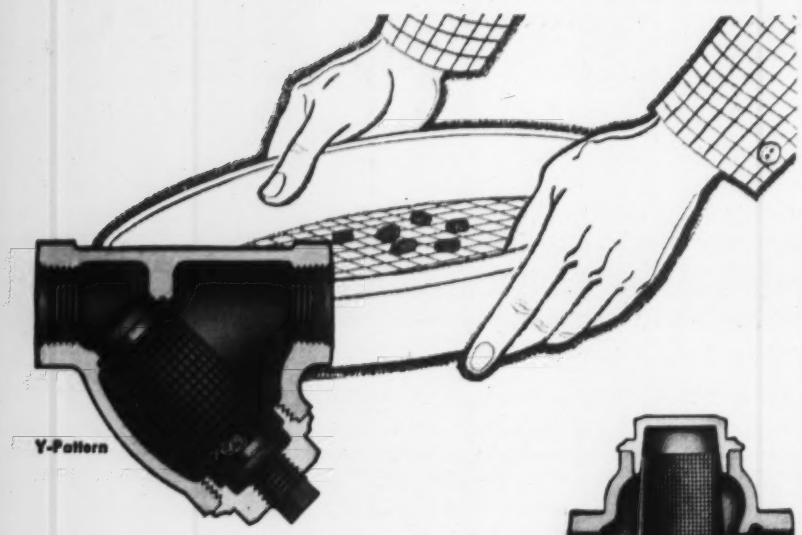

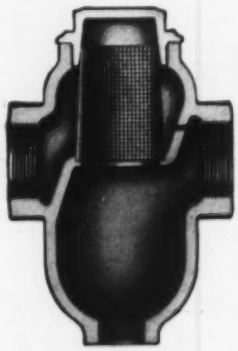

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Available in both Y-patterns and vertical types, with full range of capacities and sizes. For literature on Crane Sediment Separators, see your Crane Representatives or write to address below.

CRANE VALVES & FITTINGS

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Major River Use Projects

the project was at the 18% mark at the end of 1956. Work on the dam started last summer. The dam will be an earthfill structure 163 ft high and 3,500 ft long; it will contain 6 million cu yd of material. Local counties Sonoma and Mendocino are participating in the undertaking.

• **Kings River**—Pacific Gas & Electric Co.'s $76.5-million **Kings River development** in California went ahead during 1956. **Courtright Dam**, a rockfill structure 840 ft long and 290 ft high, was 27% complete when work shut down for the winter. **Wishon Dam**, a 3,350 ft-long, 250 ft high rockfill, was 39% complete. The development also includes enlargement of **Balch diversion dam and powerhouse**, and construction of **Haas and Kings River powerhouses**. Started in the spring of 1955 the development, which will deliver 261,000 kw, is scheduled for completion by 1960.

• **Feather River**—PG&E's $38-million **Poe project** on the North Fork of the Feather River is to be finished in 1958. To date, the 106,000-kw powerhouse is 43% complete, and driving of a 7-mi of tunnel is 90% along.

Two PG&E plants on the Upper Feather River—**Butt Valley and Caribou 2**—will cost $32.6 million and generate 145,000 kw. Tunnel work on the Butt Valley project, started last summer, is 10% complete. At the Caribou 2 plant, work on the tunnel, afterbay dam, penstock and powerhouse excavation also started last summer and is 10% along.

• **Southern California Flood Control**—The Los Angeles County Flood Control District completed in 1956 another 28 storm drains, at a cost of over $17 million, in its $179 million storm drain program launched in 1953. In addition, work was initiated on 15 drains, worth $22.5 million. These included the year's biggest new job, a $9-million relief drain in south central Los Angeles, just under way at year's end. As 1956 ended, nearly $71 million had been spent or allocated toward the overall program.

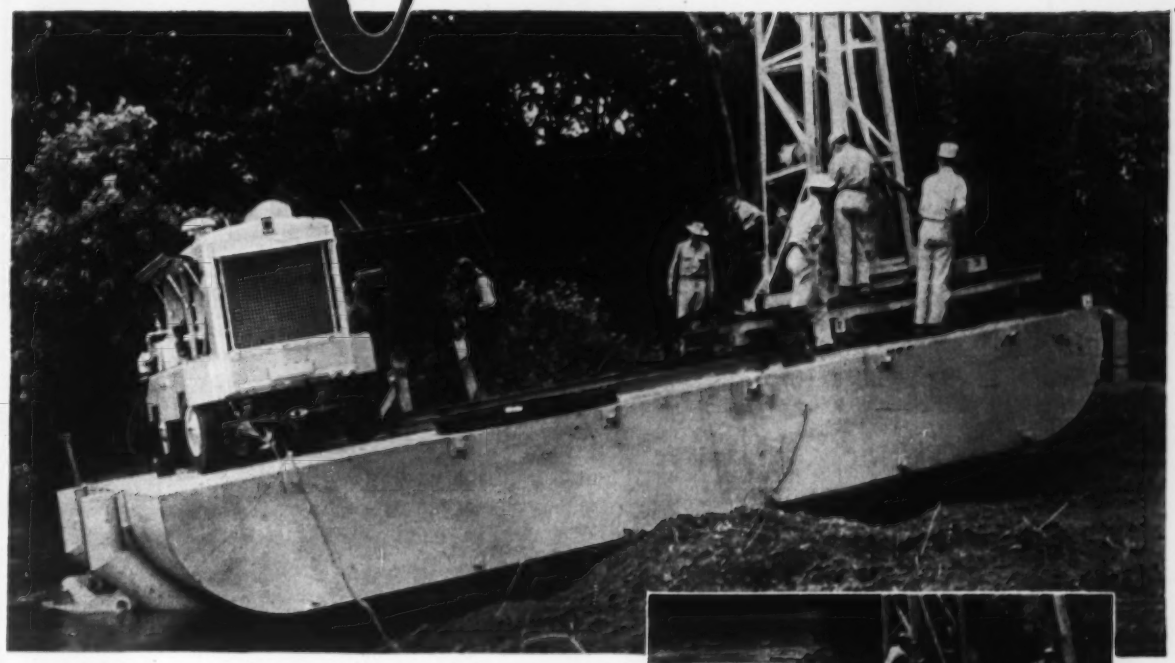
The Corps of Engineers completed the $7.3 million earthfill **San Antonio Dam** in the San Gabriel Mountains. The dam, along with two important channel improvements nearing completion on the San Antonio and Chino Creek channels, will offer a large measure of flood protection to the Pomona Valley and Western San Bernardino County.

Two large channel projects on the lower Los Angeles River, totaling over $5 million, are virtually finished, and a $4.9 million contract, awarded in May, for breakwater construction at Redondo Beach, was one-third completed by the end of the year.

At the close of 1956, some $33 million worth of Corps of Engineers projects were still under contract, including a $5.1-million contract for the final reach of the Los An-

30" PIPELINE CROSSES POTOMAC

with the aid of a drill-barge-mounted GYRO-FLO PORTABLE



Unique submarine drill barge, built by Associated Pipe Line Contractors, Inc., is powered by a standard Ingersoll-Rand 600 cfm Gyro-Flo portable compressor

Associated Pipe Line Contractors, Inc., recently completed laying a 30" line across the Potomac River near Rockville, Md. The river at this point was 2800 feet wide with a bed of solid rock.

This difficult rock drilling problem was solved by using the all-steel drill barge shown above, built by Associated. On it are mounted an Ingersoll-Rand SD-65 Submarine Drill which is powered by a 600 cfm Gyro-Flo portable air compressor. The Gyro-Flo is anchored aboard without removing the running gear, thus leaving it available for on-land drilling work.

This river crossing is a part of Associated's 80 mile section of Transcontinental Pipe Line Corporation's main line looping program from Texas to New York. The Gyro-Flo mounted on the barge was only one of a number used on this project, and these compressors, together with other Ingersoll-Rand rock drilling equipment gave their traditional trouble-free performance.

Wherever contractors need dependable, low-cost air power, they agree that "there's only *one* Gyro-Flo". Ask your Ingersoll-Rand representative to give you the complete story.

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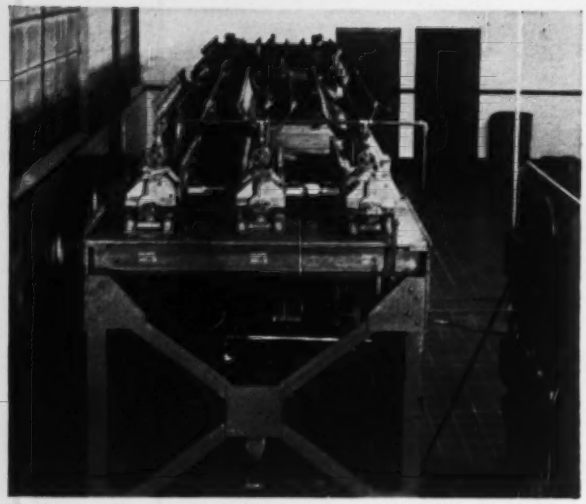
AN UNBEATABLE COMBINATION... GYRO-FLO COMPRESSORS AND I-R ROCK DRILLS

Tuffy Wire Rope Tips



Until recently, a relatively meager amount of factual data has been available for estimating life expectancy of wire rope. Predicting how much service life could be expected from a given wire rope construction under a given set of operating conditions was largely a matter of guess-work, trial-and-error and generally inexact calculations.

Since bending stresses are a major factor in wire rope life, Union Wire Rope engineers designed the Accelerated Fatigue Tester, shown above, with which to pin down the effects of bending on wire rope. Now, from a long and exhaustive series of bending tests, scientific data has been accumulated and organized to take the place of former rule-of-thumb methods.

The data established by this laboratory research is based on the effect of various sheave diameters on bending stresses of various constructions of wire rope.

From test data, bending-life curves have been plotted by Union Wire Rope engineers for each of the more widely used rope constructions. Analysis made on each of these curves showed them to follow a pattern expressed by the curve shown in Fig. 1.

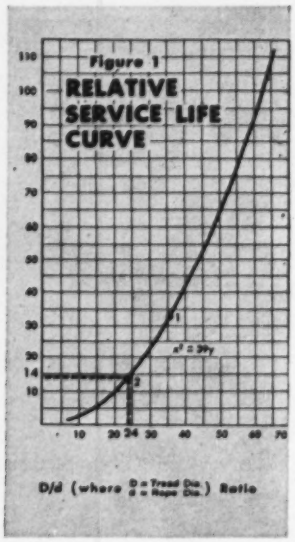


Table 2

BENDING-LIFE FACTORS

When Using Curve of 6x25 FW

CONSTRUCTION	FACTOR
6x7	0.57
18x7	0.67
6x17 Seale	0.73
6x19 Seale	0.80
6x21 Filler Wire	0.92
6x25 Filler Wire	1.00
6x31	1.00
8x19 Seale	1.14
6x37	1.33
8x19 Warrington	1.33
Tiller Rope	2.00

Table 3

SHEAVE DIAMETER FACTORS

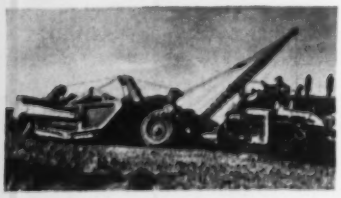
ROPE CONSTRUCTION	GENERAL PURPOSE RANGE D/d Ratios (Where D = Tread Dia. d = Rope Dia.)	
6x7	63	42
18x7	54	36
6x17 Seale	49	33
6x19 Seale	45	30
6x21 Filler Wire	39	26
6x25 Filler Wire	36	24
6x31	33	22
8x19 Seale	31	21
6x37	27	18
8x19 Warrington	27	18
Tiller Rope	18	12

Note on Fig. 1 the curve shows that as the ratio of tread diameter to rope diameter increases (see D/d figures at bottom of chart) the longer the relative service life as expressed by the figures at the left of the chart.

However, there are few pieces of equipment on which sheave and drum sizes can be large enough to afford D/d ratios above 50. From test data the general-purpose range of D/d ratios was determined. Those recommended are set up in Table 3.

Spotted on the curve, for example, is the D/d ratio of 24 at point 1 and D/d ratio of 36 at point 2—these being the range for general purposes taken from Table 3 for the 6x25 filler

Tuffy Special Wire Ropes are tailored to special use. Ordering is easy:

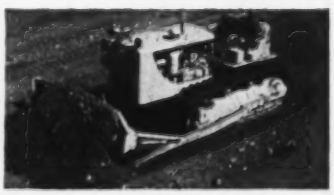


Tuffy Scraper Rope

Moves more yardage per foot because **Tuffy** Scraper Rope is specially built to take the beating of extreme drum-crushing abuse. Flexible; withstands sharp bending; hugs sheave grooves and winds snugly and smoothly on drums. High resistance to load shock on slack line.

Tuffy Dragline Rope

Longer-wearing line for all dragline operations. Special abrasion resisting construction which also gives extra flexibility. Tuffy Draglines also spool better, ride better on grooves and hold tightly to drums when casting. Consistently dependable in handling any material—wet or dry dirt, sand, gravel, rock, cement or minerals.



How to predetermine wire rope life

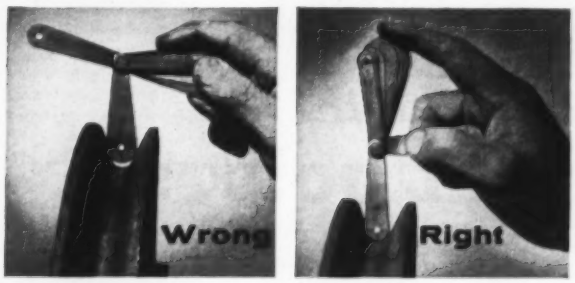
Here's the easier, surer way developed by Union Wire Rope Corporation Engineers

rope. Moving from these points to the left on the chart, the relative service life of this rope ranges from 14 to 34 units of any service measure used, such as yards, tons, days, etc.

Now to determine the relative service life of say a 6x37. Its bending life factor (see Table 2) is 1.33 as compared to 1.00 for the 6x25 filler wire. Multiply the service life readings of 14 and 25 for the 6x25 filler wire by 1.33, and we find the service life range of the 6x37 falls at 18 and 27 units of service. Relative service life of other ropes are determined in the same way by using the bending factor indicated for each as the multiplier.

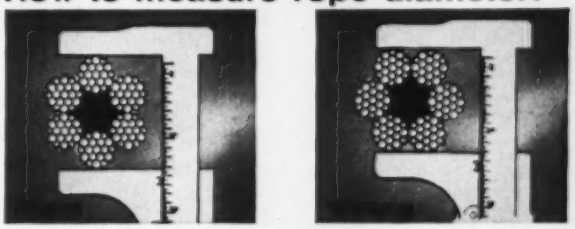
Of course bending is not the only wear factor in wire rope operation, and the general rule—that more flexible ropes should be used as bending stress increases with decrease in diameter of sheave or drum—has to be modified in field use. In fact there are eight other principal operating conditions, in addition to bending stresses, that affect wire rope service life. They are loading conditions, portability, corrosion, abrasion, rope speeds, materials handled, and equipment design.

What Size Rope?



Check groove diameter: When new wire rope is to be used on old equipment, make sure the tread or bearing surface of all sheaves is of sufficient groove diameter to avoid pinching the rope.

How to measure rope diameter:



Use a machinist's caliper. Be sure to measure the widest diameter.

How to measure tread diameter:

Select the smallest sheave or drum to be used with the new wire rope, and measure actual diameter of tread.

Sheaves with grooves corrugated with rope lay impression should be replaced with new ones before installing new wire rope.

New wire ropes are usually over-size. It is advisable to have groove diameters of sheaves or drums as large as the actual calipered diameter of the new rope, or slightly larger. We recommend sizes as follows:

Diameter of Rope	Groove Diameters	
	Minimum	Maximum
½" and smaller	diameter + 1/32"	diameter + 3/32"
9/16-1"	diameter + 1/16"	diameter + 1/8"
1-1/16-2"	diameter + 3/32"	diameter + 3/16"
Over 2"	diameter + 1/8"	diameter + 1/4"

Following the above instructions, you will know the Diameter of Wire Rope to use to fit your equipment.

Just say **Tuffy** give length and size, and forget complicated specifications.

Tuffy Slings and Hoist Lines

Here's a team that cuts hoisting and down-time costs in all types of materials handling.

Tuffy Slings are made of a patented, machine-braided fabric that stays extra flexible, and isn't materially damaged by knotting or kinking.

Tuffy Hoist Line is a special construction with the extra flexibility and toughness for longer service life on overhead, stiff leg and mobile cranes, derricks and clamshells.

Tuffy Dozer Rope

Long after ordinary ropes are worn out, **Tuffy** Dozer Rope has the stamina it takes to keep on handling the blade. 150' reels of 1/2" or 9/16" mounted on your dozers let you cut off worn sections without wasting good rope. This unbeatable combination piles up sizeable savings on dozer rope costs.

Your Tuffy Distributor is ready to help you with any wire rope problem.

If you aren't acquainted with him, look under "Wire Rope" or "Slings" in the classified pages of your telephone directory.

FREE! New "Rope Dope" Educational Bulletins

They're packed with boiled-down, useful information on the selection and care of wire rope for greatest service. Just ask your Tuffy Distributor to put your name on his mailing list.

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AMBRIDGE STEEL JOISTS

AmBridge Steel Joists arrive at the site completely shop-fabricated, ready to erect. Their light weight, combined with the simplicity of end connections and accessories, appreciably reduces man-hours of erection time. No special equipment or falsework is needed.

This one-story, 52′ x 100′ branch office building is strong and safe *as a bank should be.* For not only was it built around a heavy steel frame, but its floor and roof are supported by steel.

In addition to furnishing 16,700 pounds of structural steel for the frame, American Bridge also supplied 25,000 pounds of AmBridge long-span Steel Joists and 15,600 pounds of AmBridge standard Steel Joists for floor and roof construction.

USS AmBridge Steel Joists provide rigid, lightweight and economical construction suitable for any type of floor, roof and ceiling. The underslung and open-web design provides for maximum head room and allows passage of pipes, ducts and conduits in any direction.

In floor construction, the ease and simplicity of handling reduces installation time to a minimum and permits other trades to begin their work promptly. And, for roof construction, these modern, new-design joists cut the time required to put your structure under cover.

For detailed information about the time- and money-saving advantages of using USS AmBridge Steel Joists on your next job, get in touch with our nearest Contracting Office, or write direct to Pittsburgh for a free copy of our 36-page catalog. It is the only complete steel joists catalog with design information for spans up to 120 feet. Ask for your copy today, or see it in Sweet's Files.

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AMBRIDGE STEEL JOISTS

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UNITED STATES STEEL

PRIVATE HYDRO construction, such as shown at $85 million Noxon Rapids site on Clark Fork River in Northwest, continued strongly in 1956.

geles channel in Long Reach—largest single channel improvement contract ever to be let by the Corps in this area.

• **Upper Colorado River Project**—Bids on the major portion of the $421-million **Glen Canyon Dam** phase of the Bureau of Reclamation's Colorado River Storage Project—also known as the Upper Colorado River Project—are to be taken early this year. The dam will be a 700-ft-high concrete arch with a 1,500-ft-long crest. Concrete in the project totals 5 million cu yd. Also included in the bidding is a 2,900-ft-long, 41-ft-dia left bank diversion tunnel and a powerhouse structure for the 800,000-kw installation. Successful bidder will be allowed 2,500 days to complete the project, which will have a reservoir storage capacity of 28 million acre-ft. Already awarded are two $1-million access road contracts for 25 mi of roads. And a $2.5-million right bank diversion tunnel contract is under way. Also already bid is a $4-million steel arch bridge across the Colorado River Canyon, 900 ft downstream of the damsite.

Flamingo Gorge Dam—Part of the Upper Colorado River project, Flaming Gorge will be a $65-million thin concrete arch on the Green River in Wyoming. Access roads are under contract. Bids will be received soon for permanent camp and a 1,200-ft diversion tunnel. Bid date for main dam and power plant will be set after amount of fiscal 1958 appropriations is known.

Navajo Dam—Bids will be called in 1957 on this 27,000,000-cu-yd earthfill dam—the Bureau of Reclamation's largest. Located on the San Juan River in New Mexico, this phase of the Upper Colorado River project will store 1.5-million acre-ft of water for irrigation.

• **Weber Basin Project**—1957 will see completion of this $70-million Bureau of Reclamation project to supply irrigation and domestic water for the area around Ogden, Utah. Completed are **Wanship dam, Weber aqueduct, Gateway Tunnel** and **Gateway Canal. Davis Aqueduct** ($4.8 million) is 75% complete, **Pineview dam** enlargement ($1.4 million) is 75% complete, **Slaterville Diversion Dam** ($750,000) is 80% complete, and Wanship and Gateway power plants ($450,000, excluding machinery for 5,400-kw capacity) are 10% complete.

• **Arkansas River Basin**—Corps of Engineers awarded the first contracts last year on interdependent units of the **Arkansas River Development Project.** This multipurpose project for flood control, water conservation, hydro power, and navigation from the Mississippi River to near Tulsa, Okla. will cost about $1.1 billion and require 15 years to complete. It will include seven new multipurpose dams and reservoirs, bank stabilization and about 20 low-head locks and dams.

Major projects in early stages of construction include the $31.4-million **Oologah Dam** on the Verdigris River, now 7% complete, to provide storage for flood control, navigation and municipal water supply for Tulsa, Okla. Contracts will be awarded this year for completion of the 4,100-ft-long, 129-ft-high earthfill embankment. Initial contracts were awarded last December for the 153-million **Eufaula Dam** project on the Canadian River in eastern Oklahoma. The dam will be 3,180 ft long including both the compacted earthfill and concrete spillway and powerhouse sections. **Keystone Dam,** on the mainstem of the Arkansas River near Tulsa, is just getting started. Estimated project cost is $137 million. The earthfill embankment and concrete spillway will be 4,570 ft long and 120 ft above stream bed. Also on the Arkansas River, in western Arkansas is the 90-million **Dardenelle Dam** project, on which initial bids will be received in May, for access roads. The 2,570-ft-long, 70-ft-high structure will contain 250,000 cu yd of concrete in the dam, powerhouse and navigation locks.

Major projects in the Arkansas basin also advanced constructionwise include the $15.6-million **Toronto Dam** on the Verdigris River in Southern Kansas, 25% complete; the $70-million multipurpose **Table Rock Dam** on the White River in southern Missouri, 25% finished; and the $18.5-million **Wichita (Kansas) flood protection** project, 72% complete.

• **Other projects in Southwest**—Work continues on the $10.6-million **Dallas Floodway,** 75% complete; and the $80-million **Buffalo Bayou Project** for flood protection of Houston, Texas, 15% finished. Projects to be started this year include the $52-million **Greer's Ferry Dam** on the Little Red River near Harbor Springs, Ark. for flood control and hydro power; and possibly the $15.4-million **Canyon Dam** on the Guadalupe River in Texas. **At McGee Bend Dam** on the Angelina River in east Texas, an access road to the damsite is under way. Project cost will be about $51 million. The dam will be 19,100 ft long, with a multipurpose reservoir containing 4 million acre-ft of storage space.

The Corps of Engineers has completed about $25 million worth of construction on the $33-million **Gulf Intracoastal Waterway** to furnish a 420-mi barge channel, 125 ft wide by 12 ft deep, from the Mexican border across Texas to Louisiana. It also has completed nearly $50 million worth of improvements to the deepwater entrance channels along the Gulf, for which projects totaling $72 million have been authorized.

• **Missouri River Basin**—There will be a substantial step-up in contracts awarded this year for Corps of Engineers construction—an estimated $152 million or nearly four times last year's awards.

Based on expenditures through 1956,

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Industrial ENGINATORS®

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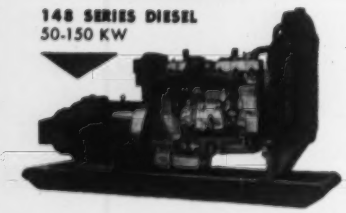
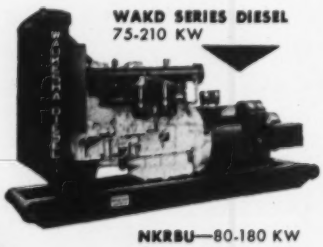
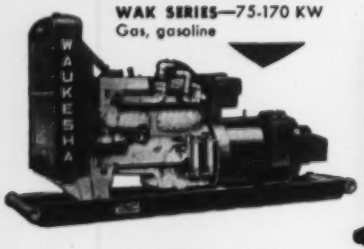


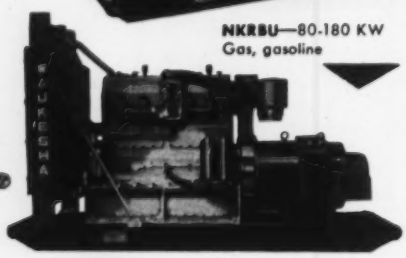
148 SERIES DIESEL
50-150 KW



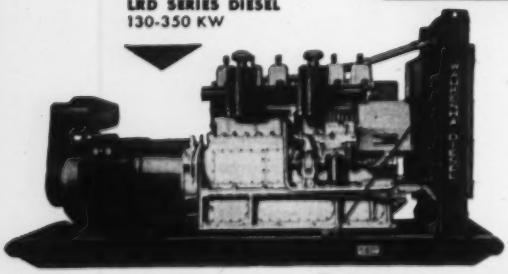
WAKD SERIES DIESEL
75-210 KW



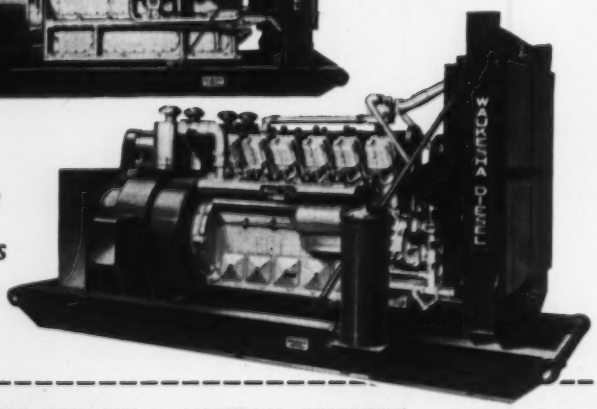
WAK SERIES—75-170 KW
Gas, gasoline



NKRBU—80-180 KW
Gas, gasoline



LRD SERIES DIESEL
130-350 KW



VLR SERIES—250-730 KW
LPG, natural gas, Diesel

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Major River Use Projects

the Corps' authorized Missouri River Basin construction program had reached 46% of completion at year's end. At that time, $405 million worth of projects were essentially completed; $1.5 billion worth of projects were either under construction or scheduled for construction this year; and $120 million of projects were in the preconstruction planning stage. The total current estimated federal cost of the overall Missouri River Basin development program is $2.4 billion.

Oahe Dam near Pierre, S. D., is 18% complete. Under contract are three earthwork contracts totaling 40 million cu yd to cost $16 million, and three outlet works contracts totaling over $17 million. A $50-million relocation program is under way including municipal, highway and bridge projects. Major contracts to be awarded this year include: The upstream power tunnels on the left abutment; outlet works control shaft superstructure; and the 18-million cu yd earthwork contract Stage 2 of the spillway. Supply contracts will be awarded early this year for service and emergency gates and gantry crane. Other scheduled awards are for the hydropower turbines, and extension of the west access railroad and bridge. Oahe is to cost $380 million when complete.

Garrison Dam, 75 mi northwest of Bismarck, N. D., received Congressional authorization last year for installation of its fourth and fifth 80,000-kw generators, which are scheduled for completion in 1959 and 1960. The $294-million project, with a gross storage capacity of 23 million acre-ft of Missouri River water is 86% completed. Construction emphasis during 1956 was on the $6.9-million spillway and stilling basin contract, which was essentially completed. Contracts will be awarded this year for penstocks, surge tanks and generators for the two added power plants.

Fort Peck Dam on the Missouri River in northeastern Montana is having its power plant capacity increased from 85,000 kw to a total of 165,000 kw. A contract for turbines for the additional 80,000 kw of hydro power was awarded last year. A generator contract will be awarded early this year; also contracts for construction of the control shaft and powerhouse foundation, and for tunnel liner, penstock and surge tank. Completetion is scheduled for May, 1961.

Fort Randall Dam near Lake Andes, S. D., was dedicated last August. The last of its eight 40,000-kw generators went on the line in January 1956 and operations throughout the year fulfilled all the design functions of flood control, navigation, hydro power and water conservation. The $186-million project is completed.

Gavins Point Dam near Yanktown, S. D. is 92% complete and practically in operation.

Big Bend Dam to be built near Chamberlain, S. D., was authorized as the sixth in

with Monotube Foundation Piles...

CONTRACTOR SAVED 19 DAYS

PILE DATA

Type—Monotube
Diameter—12 inch
Gage—7
Number of piles—1438
Length—up to 90 feet

Constructed for:
United Illuminating Co.,
Bridgeport, Conn.

Engineers:
Jackson & Moreland, Inc.,
Boston, Mass.

General Contractor and Foundation Contractor:
C. W. Blakeslee & Sons,
New Haven, Conn.

One of the two standard rigs, shown here driving batter piles. Any specified batter is easily met with Monotubes.

Here's economy in industrial work.

Light weight, easy handling and fast field-splicing of Monotube piles helped this contractor reduce anticipated driving time by 19 days. Piles were driven at the rate of 2500 feet per shift using two rigs. Learn how Monotubes can help *you* save time, cut cost. Write The Union Metal Manufacturing Company, Canton 5, Ohio, for detailed catalog information.

Architect's rendering of Bridgeport Harbor generating station, Bridgeport, Conn.

FIFTIETH ANNIVERSARY 50 1906-1956

UNION METAL
Monotube Foundation Piles

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CEILING GRINDER

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One man will average almost 4000 sq. ft. per day. Does not need scaffolding.

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the Corps of Engineers' mainstem system of dams on the Missouri. Field surveys and office studies have been initiated and preconstruction planning can be completed next year, provided necessary funds are appropriated.

Tuttle Creek Dam on the Big Blue River 12 mi above Manhattan, Kansas—the key impoundment in the system of planned flood control projects on the Kansas River system—will have a gross storage capacity of 2.3 million acre-ft. The $92-million project is 13% complete. Existing contracts for the outlet works, spillway and State 3 embankment will be finished this year. Contracts will be awarded this year for the spillway structure, completion of the embankment, spillway excavation and outlet channel excavation.

Pomme de Terre Dam on the river by the same name in Missouri is expected to get under way this year with the awarding of the first contract. Initial construction will include the outlet tunnel excavation and part of the embankment. This project is one of nine Corps of Engineers reservoirs designed for control of floods in the Osage-Marias des Cygnes River Basin.

The authorized 9-ft **Missouri River Channel Stabilization and Navigation Project** is 82% completed from Omaha, downstream to the mouth of the Missouri, and 40% finished from Omaha upstream to Sioux City. The $341-million project covers 760 mi of river. Last year the Corps of Engineers awarded 27 new construction contracts for pile-dike structures, bank revetment and other channel control structures. A 6.5- to 7-ft navigation channel now is available on the river from Omaha to its mouth near St. Louis, with regular commercial barge service in operation.

● **Reclamation Region 5**—Drought conditions in the Southwest have given added significance to the $24-million **Middle Rio Grande** Project in northcentral New Mexico. Now 52% finished and scheduled to be completed in 1960, the project has demonstrated the effectiveness of river channelization in conserving water through more efficient conveyance. About $4 million was spent on this project last year including the rehabilitation of **San Acacia Diversion Dam**, and an equal amount is programmed for additional river channelization, and canal and lateral rehabilitation during 1957.

Last year **Alamogordo Dam** on the Pecos River in New Mexico was raised 16 ft and its spillway was enlarged, at a cost of $1 million.

This year, construction will get under way on **Fort Cobb Dam** with an expenditure of about $2.8 million. An earthfill, it will be located near Fort Cobb, Okla. on Pond Creek, a part of the Washita River project which also includes an earthfill dam near Foss, Okla. on Washita. Completion of the project is scheduled for 1962.

● **Reclamation Region 6**—Righ-of way problems have held up the start of construction on the $89-million **Yellowtail Dam** on the Big Horn River in Montana. Funds have been appropriated and construction may get under way this year. The 1.7-million-cu yd concrete arch dam will be 520 ft high, with a crest length of 1,450 ft. Its power plant will have an ultimate installed capacity of 200,000 kw.

About $7 million will be spent this year on construction and equipment contracts for the **Helena Valley Unit** in Central Montana. This $11.5-million project will furnish irrigation water for 12,500 acres of land, and a supplemental municipal water supply for Helena, Mont. A $2-million contract for a 7-ft-dia horseshoe tunnel, 2.6 miles long, was awarded last year. Contracts were scheduled to be awarded early this year for a 300-cfs pumping plant, including equipment. Contracts will be awarded this year for the project's regulating reservoir and canal construction.

The **Hanover-Bluff Unit** in northwestern Wyoming, to supply water from the Big Horn River for irrigating 7,400 acres of land, is nearly 75% finished. The project includes 6 pumping plants, 15 mi of new canals, 22 mi of rehabilitated and enlarged canals, and 19 mi of laterals.

Construction was started last year on the $3.8 million **Owl Creek** project to provide supplemental water for 13,100 acres of irrigable land near Thermopolis, Wyo. A contract will be awarded early this year for construction of **Anchor Dam** on the South Fork of Owl Creek to impound 17,300 acre-ft of water. The dam and an access road will cost about $1.2 million.

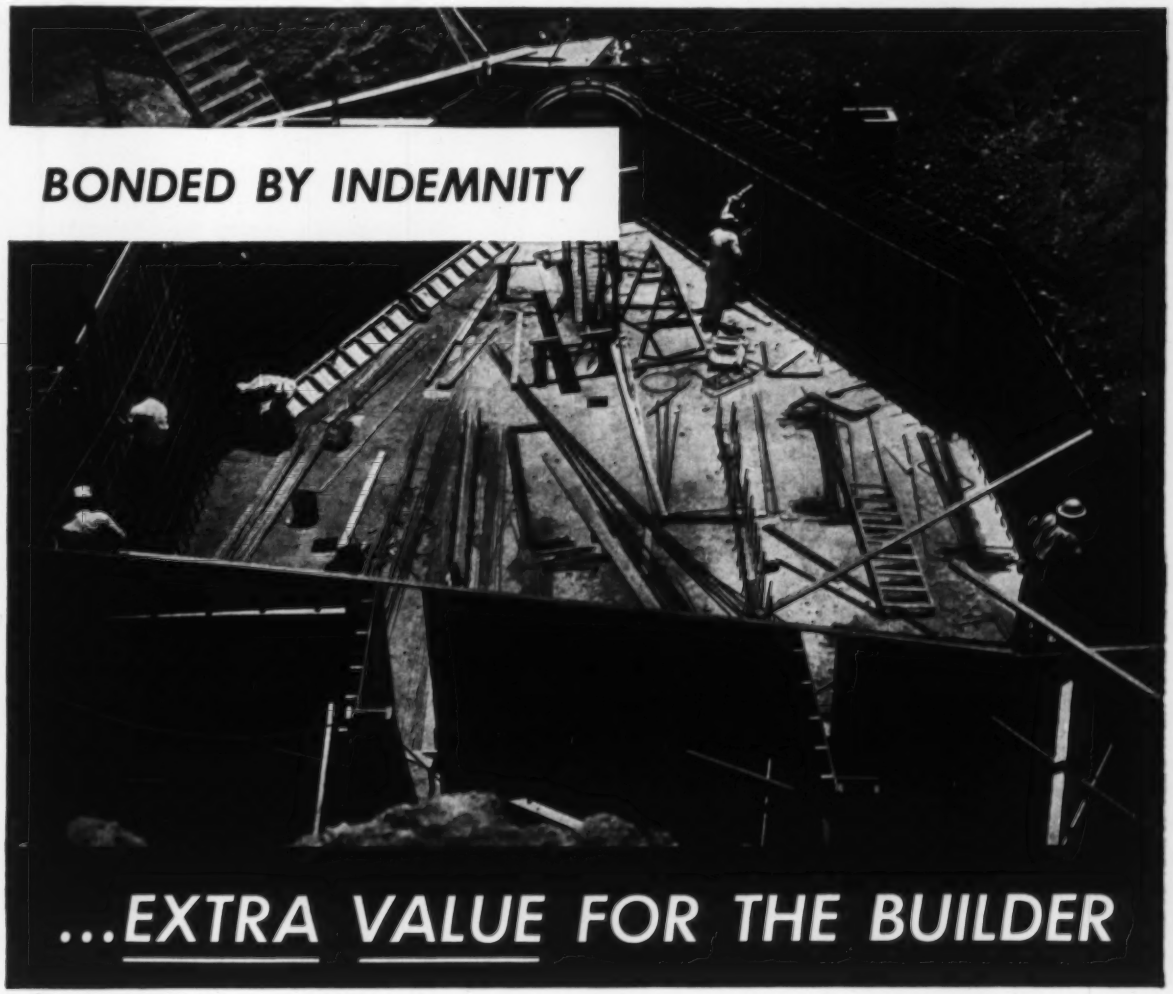
Tiber Dam in northern Montana was completed early last year. It is an integral part of the $67-million **Lower Marias Unit.**

Pactola Dam on Rapid Creek near Rapid City, S. D. also was completed last year. Total project cost is $9 million.

● **Reclamation Region 7**—A total of $33 million will be spent during the current fiscal year by the Bureau of Reclamation on its construction and rehabilitation program in Region 7, which includes Nebraska and portions of Kansas, Colorado and Wyoming. This is nearly 50% more than was spent during fiscal 1956, which totaled $24 million. Considerable construction activity was centered on a number of major projects in the Missouri River Basin.

Biggest single project is the $80-million irrigation and flood control **Frenchman-Cambridge Division** project in southwestern Nebraska. By June 30 of this year it will be 68% complete. Four dams in the project will provide a total storage of 479,400 acre-ft of water. They are: **Trenton Dam, Medecine Creek Dam** and **Red Willow Dam.** The first three of these dams are complete. Irrigation water will be delivered to 64,360 acres by a system of 200 mi. of

VALLEJO, CALIFORNIA is the location of this new Storm Drainage Gas Pumping Station, built with the protection of an Indemnity Insurance Company of North America contractor's bond.



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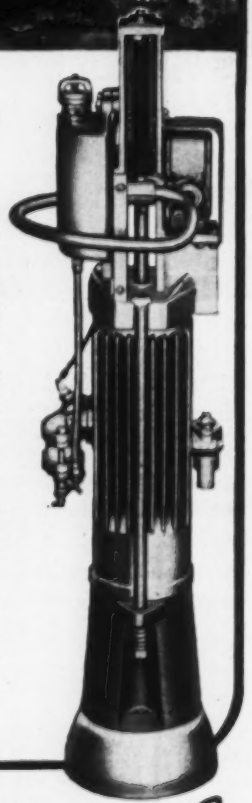

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Major River Use Projects

canals. Completion of the project is sceduled for 1963.

The **Bostwick Division** project along the Nebraska-Kansas line will be 71% completed by June. The $49-million, multi purpose project will have a total storage capacity of 944,000 acre-ft for irrigating 86,240 acres of rich bottom- and tablelands. A total of 50 mi of the 122-mile Courtland Canal system has been completed; 9 mi are under construction, and contracts for an additional 25 mi of canals will be awarded this year.

The **$15-million Cargent Unit** project for irrigating 17,600 acres of Nebraska land now dry-farmed is nearly 75% finished, with completion schduled for 1959.

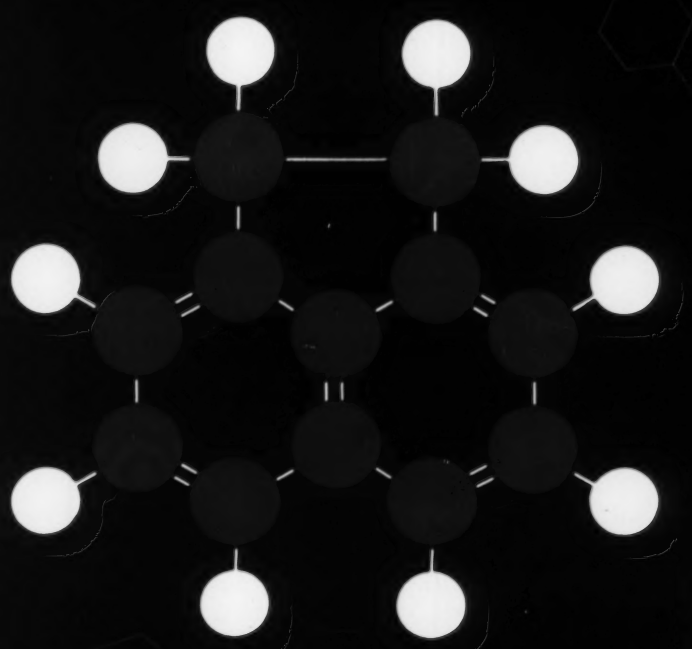
Glendo Dam on the North Platte River in Wyoming is 85% finished. When completed in 1960, it will have a storage capacity of 800,000 acre-ft for flood control, irrigation and hydro power for its 24,000 kw plant.

• **Upper Mississippi River**—Contracts to be awarded this year for navigation and flood control work in the North Central Division of the Corps of Engineers will total about $45 million. By comparison, $35 million of construction contracts were awarded last year. About $27 million of this total was for work on Great Lakes harbors and connecting channels.

Three contracts totaling $22.8 million were awarded last fall for deepening the **Amherstburg Channel** in the Detroit River. These were the first contracts awarded under the $150-million project for deepening the connecting channels of the Great Lakes to provide for 27-ft navigation. Additional contracts will be awarded this year for dredging work in the **St. Marys River** and in **Lake St. Clair.** The entire project is scheduled for completion in 1963.

At Minneapolis, Minn., the Corps of Engineers' $10-million **St. Anthony Falls Lower Lock and Dam** were completed last year. The new lock has a chamber 400 ft long and 56 ft wide. At Keokuk, Iowa the $13-million **Lock No. 19** on the Mississippi River is nearing completion and will be placed in operation this spring. On the Illinois Waterway the first contract in the $100-million **Calumet Sag Channel** modification project is 50% finished. It is for widening the westerly 3 mi, at a cost of $1.8 million. A $2.4-million contract for widening the next 3 mi. was awarded last November. This year, the Corps of Engineers expect to ward contracts totaling $15 million for reconstruction of railroad bridges over the channel and for additional channel widening.

• **Lower Mississippi River**—Construction and maintenance expenditures on the Corps of Engineers' $1.3-billion **Mississippi River and Tributaries Project** will total about $62 million for the current fiscal year, com-



Let's take a fresh look at

CREOSOTE...

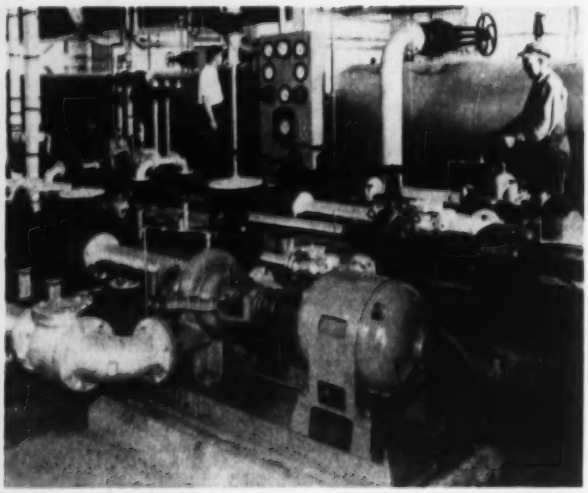
a galaxy of molecules makes it your best wood preservative investment!

Here are some vital facts you

Laboratory and field tests show why CREOSOTE gives the most protection for your preservative dollar

Laboratory Research is a never-ending process with creosote producers. Koppers researchers are constantly exploring the composition of creosote—some of its 162 chemical constituents are shown on our cover—for more information on its uniquely effective preservative action. Research such as this has already demonstrated that more than 50 of creosote's compounds are toxic to insects and fungi. This multiple toxicity is one of the reasons you can get *50-year plus* preservation from creosote.

Field Research has proved that creosote has the greatest "staying power" of any wood preservative, even under severe leaching conditions that soon render other chemicals ineffective. Tests have been conducted at a well-known marine testing facility to ascertain just what the leaching effect of sea water does to various preservatives. Creosote has shown itself to have the longest toxic life under these severe conditions. This field testing has also led to formulations of creosote that have improved its resistance to limnoria in marine service.



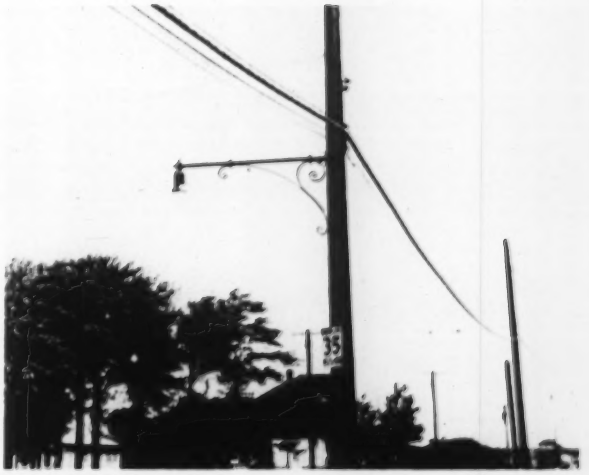
You, The Customer benefit from this research work since up-to-date knowledge of creosote and effective treating procedures is made available to the entire industry through the American Wood Preservers Institute. As a result of this cooperation, industry-wide specifications assure clean, uniform treatment that gives the user of pressure-creosoted wood full value for his preservative investment. A typical control room of a modern treating plant is shown at left.

CREOSOTE...
the modern preservative

should know about CREOSOTE!

Every day brings new proof that CREOSOTE gives pressure-treated wood unequaled service life

Construction Firms know, from experience, that creosote is the only wood preservative safe for use where long life of wood construction materials is the prime requisite. The piling shown, for example, was pressure-creosoted in 1897 and has been in service for 59 years without any sign of decay or structural failure. Leading consulting engineers endorse pressure-creosoted foundation piling as a construction material with an expected life of at least 100 years.



Utilities realize too, that creosote is the only preservative proved by the test of time. The poles shown have given more than 56 years service in an electrical utility's line . . . and there's no sign of replacement needed. All over the country, utilities depend on pressure-creosoted poles for long-lasting, economical distribution and transmission systems. There's nothing that can compare with creosote for clean, effective protection of utility poles: some half-million poles have been delivered to the largest utility network in the country, *and there hasn't been a single complaint about cleanliness.*

Railroads are solidly sold on creosote as the best wood preservative. Tie life depends on creosote! Through almost universal adoption of pressure-creosoting, the nation's railroads have increased the average life of their crossties from 6 years for untreated ties to more than 35 years for pressure-creosoted ties. In fact, the principal cause of tie failure today is *not* decay, but the effects of traffic and other factors which cause mechanical failure.

Wherever wood is used as a permanent construction material, experience shows your best investment in a preservative is CREOSOTE!

with a proved record.

UNIQUE CASE HISTORY

of extended utility pole life proves the unequaled preservative action of CREOSOTE!

Pressure-creosoted poles have been used in England since 1870. Many poles still in service are more than 80 years old.

In a quaint English village, Koppers Tar Products Division personnel found telegraph poles which had been installed so long ago that accurate records of their age were not available. However a search of the files of Her Majesty's Post Office, which has charge of telegraph and telephone communications, indicated that many of the poles in this same line had been in service since 1875!

A pole which bore legible markings of 1893 was removed from service for inspection. As shown in the photo below, there was no trace of decay or deterioration—even in the 8-foot portion of the pole which had been underground for more than 63 years!

It's through case histories such as this that creosote has established its recognition for proved preservative action. It's as true today as it was well over 50 years ago—*when long life of wood is required, there's no substitute for creosote.*

An official of Her Majesty's Post Office (left) and Mr. R. R. Holmes, Koppers Tar Products Division Vice President, examine good condition of buried portion of ancient pole.

Get all the facts on CREOSOTE

before you decide on any preservative treatment

Write today for your copy of this booklet telling "Why 90% of Wood Preserved Today is Preserved with Creosote." You'll find it full of facts and figures which prove that among all preservatives, your best investment is creosote . . . for long life and real economy. Address your request to Koppers Company, Inc., Tar Products Division, Dept. 1450, Pittsburgh 19, Pa., or to the Koppers District Office near you.

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CREOSOTE

TAR PRODUCTS DIVISION

pared to $53 million last year. To date, $963 million has been allotted to the project. Substantial construction progress has been accomplished including the completion of 1,312 mile of mainline levee. The remaining 281 mi of levee are in place and have only minor deficiencies in section or grade. Of the 5.6 mi of floodwall in the program, 4 mi are finished. In the 450-mi bank stabilization program, 325 mi of revetment have been completed between Cairo and Baton Rouge, and 25 mi below Baton Rouge.

The 960-acre industrial fill and channel dredging on the **Memphis Harbor** project will be completed next year. To date, 19 large commercial firms have acquired sites on the fill. Excavation and pile driving have been completed and concrete work was started in January of this year on the low-sill structure of the **Old River Control Project** between the Mississippi and Atchafalaya Rivers north of Baton Rouge. Construction of the over-flow channel is under way and construction of the overbank structure will begin soon. Other major projects in the overall program include: the 41-mi **White River Backwater Levee,** 92% complete; 42 mi of the 67-mi **Arkansas River North Bank Levee** system to be finished by the end of the fiscal year; the **Vicksburg Floodwall** along the Yazoo Diversion canal now nearing completion and construction of the **Vicksburg Harbor Project** to start next year. In the Atchafalaya Basin, construction has been started on the **Whiskey Bay Pilot Channel** extension, and a high-level railroad crossing between Courtableau and Krotz Springs is completed.

Last year the Corps of Engineers also spent $18.2 million on authorized projects along the lower Mississippi, not included in the $1.3 billion overall program. This fiscal year, about $23.5 million will be spent for such work in the St. Louis, Memphis, Vicksburg and New Orleans Districts. Two big projects now in the planning stage include a $131-million levee-and-floodwall project at **St. Louis** and a $5.7- million flood protection project for urban areas at **Alton, Ill.** Major flood protection projects under way include: A $21-million project at **St. Louis,** 34% finished; the $17-million **Wood River Drainage District** to protect 13,700 acres, 61% complete; and the $6.5-million **Cape Girdeau** project 19% finished.

The $58-million project for providing a 9-ft minimum depth channel in the Mississippi between the Missouri and Ohio Rivers is 72% finished. The $13.5 million **Memphis Flood Control** project is 90% finished. The $13.6-million **Ferrells Bridge Reservoir** project on Cypress Creek in Texas is 60% finished, and a $9.7-million comprehensive flood protection project on the **Red River** below Dennison Dam is 60% finished. Navigation improvement projects now in the planning stage include the $118-million **Overton-Red River Waterway** in Louisiana and the **Ouachita and Black Rivers** project below Camden, Ark. Both will provide minimum 9-ft navigation channels 100 ft wide.

• **Ohio River Basin**—Last year the Corps of Engineers awarded $59 million worth of civil works construction in the Ohio River Basin, and completed $21 million worth of work. About $14 million of river construction will be placed under contract during the first half of this year.

Construction is expected to get under way this summer at $167-million is **Barkley Dam** on the Cumberland River 30 mi above its mouth, formerly called the Lower Cumberland Lock and Dam. Its principal features include a concrete gravity and earthfill dam, 130 ft high and 7,310 ft long; a 110x800-ft lock with a 57-ft lift; and a canal 1.5 mi long by 600 ft wide connecting Lake Barkley on the Cumberland River with Kentucky Lake on the Tennessee River. This unique feature permits the interchange of navigation traffic between the two rivers, saves 20 mi for some barge traffic, and provides an alternate route to the Ohio in case of unavoidable closure of the locks at either Barkley Dam or Kentucky Dam. The completed project will have a 693,000 acre-ft minimum pool; a 282,000 acre-ft power pool; and 1.3 million acre-ft of flood control storage. It will have a total installed power capacity of 130,000 kw.

Six major lock and dam projects are under construction in the Ohio River Basin at a total cost of $264 million. The $30.3-million **Cheatham Lock and Dam** on the Cumberland River in Tennessee is 83% complete. The 110x800 ft lock and the dam have been completed and in operation for two years, while the three 12,000-kw hydro power generators are scheduled to go on the line in 1958.

The $60.9-million **Greenup Locks and Dam** on the Ohio River near Greenup, Ky. is 18% complete. It will replace five old locks and dams. Its two locks, 110x1,200 ft and 110x600 ft, are scheduled to be finished by June 1959, and the dam by December of that year. The $13.2-million **Hildebrand Lock and Dam** on the Monongahela River in West Virgina got under way last year and is now 12% finished. When completed in June, 1959, it will replace two old locks and dams built over 50 years ago. Construction of the $69-million **Markland Locks and Dam** on the Ohio 60 mi. below Cincinnati was also begun last year. Its two locks 110x600 ft and 110x1,200 ft will begin operating in September 1958; the new 83-mi-long pool behind the dam will be established in September, 1961, and the project completed the following March. It replaces five old locks and dams. The $43.1 million **New Cumberland Locks and Dam** on the Ohio 50 mi below Pittsburgh is 12% finished, with completion scheduled for 1960. It will replace three inadequate and badly deteriorated locks and dams on the Ohio. The sixth big project—**Old Hickory Lock and Dam** on the Cumberland River above Nashville—is 93% finished. **Lock and Dam No. 41** on the Ohio River at Louisville is being modernized at a project cost of $54.5 million. A contract for a new 110x1,200 ft lock will be awarded this summer, and the entire project is scheduled for completion by June 1962. Other major construction in the Ohio River Division of the Corps of Engineers includes seven local flood protection projects in Kentucky and Pennsylvania to cost a total of $50 million. And construction has been resumed on two flood control projects: The $28.8-million **Dillon Dam and Reservoir** on the Licking River in Ohio, begun in 1946; and the $29.4 million **Sutton Dam and Reservoir** on Elk River in West Virginia.

• **Tennessee Valley**—In July, 1956, TVA began work on $35 million **Wilson Lock** whose 100-ft single lift will hold the world's record—at least until the 103-ft lift at Ice Harbor is completed. The work comprises a 110x600-ft lock chamber through the existing dam, 3.5 million cu yd of canal excavation and a high-level fixed-span bridge over the lock. Wilson Lock was the only major new river work undertaken by TVA. At **Hiwassee Dam** the world's largest pump-turbine was completed and went into operation. It consists of a 102,000-hp pump driven by a 70,000 kva motor, which when reversed becomes an 80,000-hp turbine driving a 59,500-kw generator.

Chilhowee Dam—Aluminum Company of America's fourth dam in the Tennessee Valley, $12-million Chilhowee Dam, was well on its way to completion at year end. When visited during the year, the 82-ft-high earth and rockfill structure had some concrete spillway and intake sections up to full height. The earthfill and 50,000-kw powerhouse are expected to be completed this year.

• **St. Lawrence River**—Last year was the key year for the $600-million hydroelectric development that parallels (and makes possible) the $350-million section of the **St. Lawrence Seaway** at the International Rapids. Constructors on both sides of the international border wound up the year fairly well on schedule on the power facility work; navigation work including the 10-mi, two-lock Long Sault Canal, was not quite as well along. But in all, the mammoth international project was some 40% complete by the end of 1956.

The **St. Lawrence Power Dam** (Barnhart Island Powerhouse) continued as the center of attraction, with U. S. builders having

DRAFTING TRENDS

Magnified view of the laminated bamboo construction used in Post slide rules.

Why the trend to bamboo construction?

Due to its unique characteristics, bamboo is an especially suitable base material for various unusual applications. For example, experience over many years has proven bamboo's properties are ideal for slide rule construction. Here are some of the most outstanding reasons why the growing trend is to bamboo rules:

Bamboo gives smoother operation

Slide rules of other materials often require use of lubricants to insure smooth sliding. Bamboo avoids messy additives because it has natural, sealed-in silica particles that provide *self-lubrication*. The longer you use a bamboo rule, the easier it is to operate.

Bamboo holds its dimensions, retains its accuracy

Even in hot, humid weather, laminated bamboo slide rules resist expansion better than any other material. This dimensional stability assures consistently accurate readings.

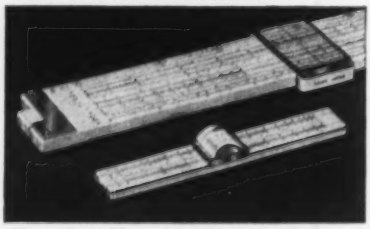
Recognizing the advantage of bamboo, Post uses it exclusively for slide rule construction. To the basic advantages of bamboo, Post has added several other features that further improve slide rule accuracy and dependability. For example, graduations are "engine-divided." Every marking is cut into the snow white celluloid face with a machine controlled knife edge. "Engine-divided" scales are easy to read, unfailingly accurate and last the lifetime of the rule.

Even the metal bound cursor on Post slide rules is designed for accuracy. A tiny, hidden spring keeps a perfectly vertical hairline.

Recent slide rule advancement

The latest development in bamboo slide rules was the introduction of Post's Versalog rule five years ago. This precision instrument meets the exacting demands of modern research, engineering and design. It features greater accuracy (four times greater in square root determination), color coding of trigonometric scales, new end zone designations for faster and surer computations, and more convenient arrangement of LL scales.

Probably the handiest bamboo slide rules made are Post's Vest Pocket rules. One has a 5" scale, the other a 4" scale with a magnifier as standard equipment. They are perfect for fast, spur-of-the-moment calculations.



(Top) *Post Versalog slide rule* (Bottom) *Post 1441 Vest Pocket slide rule*

For a free catalog describing Post bamboo slide rules, see your Post dealer or write today to the Reader Service Division of Frederick Post Company, 3658 N. Avondale Avenue, Chicago 18.

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Major River Use Projects

placed 438,000 cu yd and Canadians 405,000 cu yd as they entered the second winter of their 12-month concreting operation.

At **Long Sault Spillway Dam**, the great diversion of Long Sault Rapids finally commenced Dec. 26; had been planned for much earlier. And now, as a cableway places a rock cofferdam at the head of the Long Sault, flow gradually is deverting through a man-made cut to pass over the finished portion of Long Sault Dam.

Upstream at **Iroquois Control Dam** (which is being built to keep Lake Ontario levels unaffected as the power pool fluctuates) complete diversion was accomplished in early December, and Stage 2 cofferdam work is well under way.

On the navigation work, a 5-mi mainland portion of Long Sault Canal is about 45% done—but not on schedule. **Eisenhower Lock** (formerly Robinson Bay and Grass River Lock were both on schedule, 36% and 28% completed, respectively.

• **Littleton Project**—The 150,000-kw Littleton project on the Connecticut River bordering New Hampshire and Vermont went into operation in 1956, sharing honors with its sister Comerford project downstream as New England's largest hydro. New England Electric System built the $45-million project.

• **New England Flood Control**—Several flood control projects got under way in New England during 1956 in the aftermath of the 1955 floods. **Barry Falls reservoir and dam** on the upper Chicopee River in the Connecticut River Basin has reached the concreting stage. **Otter Brook** damsite near Keene, N. H., has been cleared and excavation has started. **Bald Mountain dam and reservoir** in Jamaica, Vt., on the West River, is expected to be started this spring. The Bald Mountain project is estimated to cost $16 million.

In the Thames River Basin at North Charleston, Conn., a dike has been finished, and the dam and reservoir are scheduled for completion early 1958.

An existing dam has been removed on the Blackstone River in Woonsocket, R. I., and a new dam having four gates is under construction to replace it.

The **Knightville Dam** and the **Littleville Dam** on the Westfield River have been finished.

• **Delaware River**—The $61-million deepening of the **Delaware River Channel** to 35 ft between Philadelphia and Trenton was begun in November on a $6-million appropriation by Congress.

• **Lehigh River—Bear Creek Dam**, $18-million flood control project on the Lehigh River in northeastern Pennsylvania, has been started under a $742,000 contract for outlet works.

Architects-Engineers:
F. A. Fairbrother & Geo. H. Miehlf,
Detroit

Consulting Engineers:
Albert Kahn, Inc.,
Detroit

Pipe Contractor:
Gorman-Lavelle Plumbing & Heating Co.,
Cleveland

TWINSBURG, OHIO—Hundreds of acres of former farmland have been transformed into the site of a mammoth body stamping plant—part of Chrysler's new expansion program.

As in other major construction projects, Clay Pipe plays an important role here. Approximately 20,000 feet, in diameters from 6 to 36 inches, were specified.

With Clay Pipe, a future of trouble-free service is assured. It can't rust or rot . . . can't corrode . . . can't crumble. It combines the lowest cost-in-place with the highest performance standards of any pipe made.

Remember these qualities when you build for the future and specify Clay Pipe—the only pipe with a proof-of-performance *long-term guarantee.*

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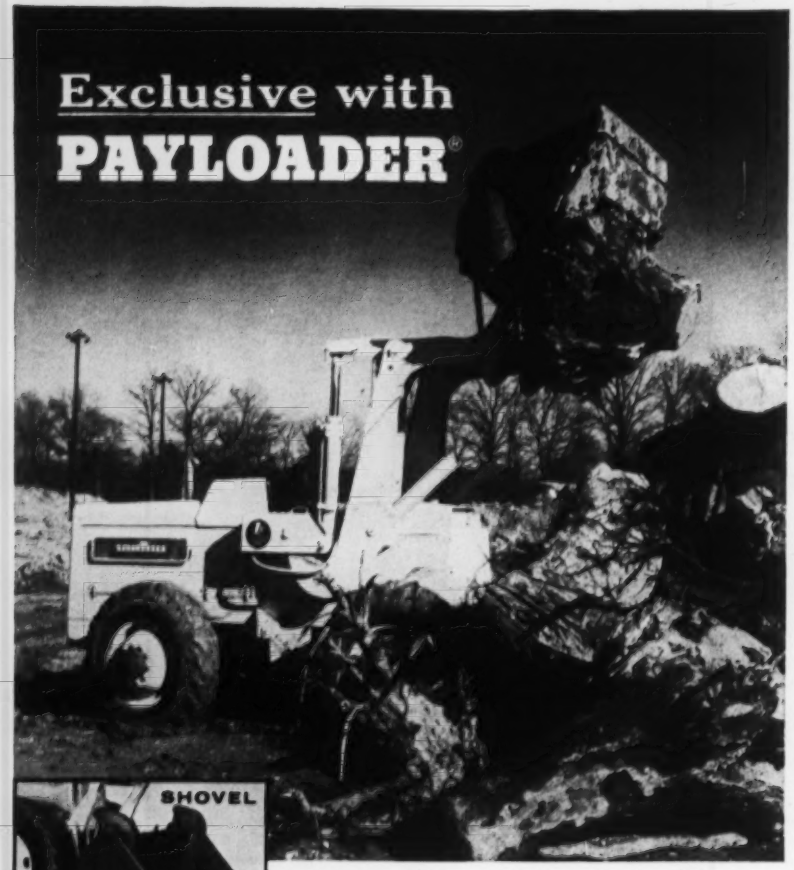

51

DROTT 4-in-1 Bucket helps you do more jobs

Another valuable attachment has been added to those available exclusively for "PAYLOADER" tractor-shovels. This is the Drott 4-in-1 bucket which, coupled with the power and mobility of the three sizes of 4-wheel-drive "PAYLOADER" tractor-shovels, gives them greater performance on many jobs, and the ability to handle many operations that usually require special machines.

More than ever before, you get more tractor-shovel when you buy a "PAYLOADER", because you get more tractor-shovel performance and more versatility. They have power-transfer differentials — an exclusive "PAYLOADER" feature that maintains effective traction on mud, gravel, ice and snow. They have no-stop power-shift transmissions . . . planetary final drives . . . power steering and 4-wheel power brakes. They have the distinctive bucket motion with 40° tip-back and powerful pry-out action that enables them to dig more, carry more and deliver more . . . to outperform any comparable size tractor-shovels.

Your "PAYLOADER" Distributor is anxious to demonstrate what one of these tractor-shovels with a Drott 4-in-one bucket can do for you. The Frank G. Hough Co., 772 Sunnyside Ave., Libertyville, Ill.

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Major River Use Projects

• **Mobile River basin**—The $20-million navigation project on the Tombigee River in Alabama, **Demopolis Lock and Dam,** was completed during 1956. **Warrior Lock and Dam** on the Warrior River in Alabama **reached 50% completion at year's** end. Total project cost is estimated at $14.6 million.

In the latter part of 1956 construction began at **Jackson Lock and Dam** also on the Tomgibee River and work has now turned the 3% mark.

• **Apalachicola River Basin**—First of four Corps of Engineer structures in this basin, **Jim Woodruff Dam,** went on the line in January. Project cost will total $46 millions.

Fort Gaines Dam on the Chattahoochee River got under way during the year and is 6% complete. This will be a $94 million project featuring a 13,570-ft rolled earth-fill and a single-chamber lock of 88-ft maximum lift.

Farthest upstream of the dams is **Buford** on the Chattahoochee above Atlanta. This $39 million structure was 95% complete at the end of last year with initial power and final completion of the project expected this year.

Fourth structure will be **Columbia Dam,** located just below Fort Gaines. It is to be started in 1959.

• **Savannah River**—A $94 million multi-purpose project, **Hartwell Dam,** is about 15% complete. Construction is being delayed by Clemson College's insistence that the height be lowered by 50 ft to prevent the school's agricultural lands from being flooded.

• **Florida Flood Control**—To cost an estimated eventual $280 million—the **Central and Southern Florida Flood Control Project** is now in the 6th year of a 10-year program. By June, 1957, the federal-state project will have used $38 million of federal funds, $10 million of state, and $11.4 million of special county tax funds.

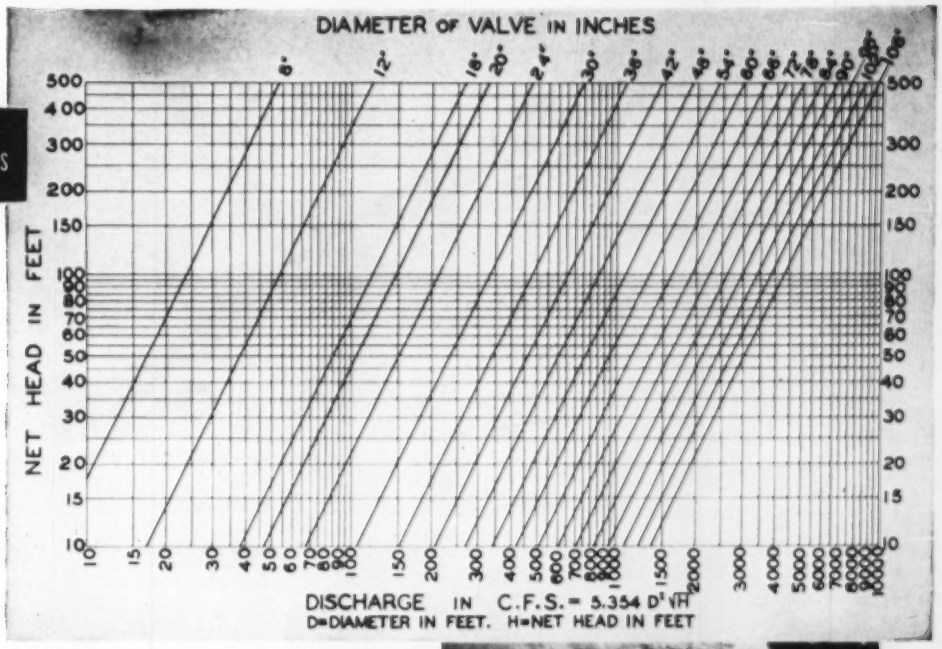
During 1956, a little over $9.3 million was spent on the project which covers 15,000 sq mi, including Lake Okeechobee, a large portion of the Everglades, the upper St. Johns and Kissimmee river basins and the lower east coast of Florida.

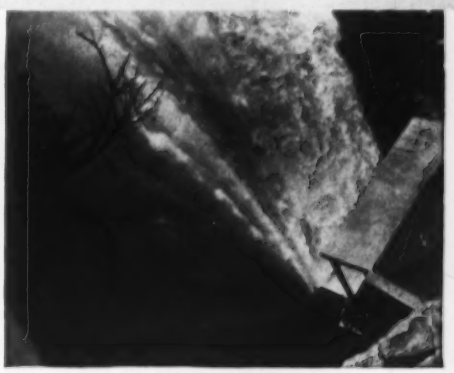
Half of the year's total went for 15½ mi of levees and 17½ mi of combination levees and canals in agricultural areas.

Completed last year at a total cost of $2 million was Pump Station No. 9 on South New River Canal at Conservation Area Levy.

During 1957 work will go ahead on canals, channels and levees. The Central and Southern Florida Flood Control Board has asked the state to appropriate $6.7 million to match anticipated federal funds during 1957.

SMS
HOWELL BUNGER VALVES





EASY REGULATION OF FREE DISCHARGE THROUGH HIGH TO LOW HEAD RANGE

SMS Howell-Bunger Valves provide easy regulation and control of water under free discharge. Tremendous amounts of energy can be dissipated with a minimum of erosion, cavitation and no vibration. Because of this valve's high discharge coefficient, pipe line or conduit size can be held to a minimum for economical construction.

The extremely rugged and simple design of the SMS Howell-Bunger Valve provides these essential features:

- Free discharge with safe energy dissipation
- Hydraulic balance without vibration
- High coefficient of discharge for an energy dissipating valve
- Minimum cavitation and maintenance
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- Only one moving part in contact with stream flow
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S. Morgan Smith Company offers you more than 75 years experience with hydraulic equipment. The SMS name plate is your assurance that performance will equal or exceed specifications. For full information on Howell-Bunger Valves, turbines and related hydraulic equipment write the S. Morgan Smith Company, York, Pennsylvania.

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IN 2 YEARS, JUST

"Fabulously low maintenance" says Fischer Lime & Cement Co. in joining the big switch to Worthington Hi-Up Truck Mixers

The part that George M. Fazackerly of Fischer Lime & Cement Co., Memphis, Tenn., is holding in his hand cost $7.00. In the two years they've been on the job it's the only replacement item that 15 Worthington Hi-Up truck mixers have needed to keep in top condition.

This outstanding maintenance record is no accident. One of the industry's pioneers with 22 years of continuous operation, Fischer has learned long ago that a regular program of rigid maintenance pays many dividends.

To keep the fleet of 54 mixers on the job, Fischer has a modern, fully equipped service and repair garage. There's even a unique five-rack wash stall for drum washouts.

The Worthington Hi-Up truck mixer also comes in for its share of the credit. Says Mr. Fazackerly, "For ability

Truck Mixers sold by Carey Equipment Company, Memphis, Tennessee

$7 FOR REPAIRS!

to take it day-in and day-out you can't beat a Hi-Up."

Since the photo was taken, Fischer Lime & Cement Co. has added 15 more mixers to the fleet. All Worthington Hi-Ups, of course. Like many other operators, they find the husky Hi-Up the leader in easy handling and low, low maintenance.

Ask your Worthington distributor for a "Mixerama" demonstration. It's an eye-opening exhibition of Hi-Up performance on the job. Or write for Bulletin 1260-B1A to Section R-71, Worthington Corp., Harrison, N. J. In Canada: Worthington (Canada) 1955, Ltd., Toronto, Ont.

THE BIG SWITCH TO WORTHINGTON. *Every year since 1952, ready mix operators have chosen more Worthington Hi-Up's than the year before.*

WORTHINGTON

A permanent water pollution control law was passed in 1956 and construction went to new highs in both sewerage and waterworks. If the federal law is now made effective and states pursue their water plans, '57 will be bigger yet.

EXPANSION EVERYWHERE—Preaeration and primary tanks are under construction (upper right) for Columbus' Scioto River Sewage Disposal Plant. The plant originally started out with 50 mgd capacity, has been increased to 80 mgd, will be enlarged to 120 mgd.

Biggest Year Ever Might Have Been

A permanent federal water pollution control law, with provision for ten years of government spending as a stimulus to sewage works construction, was the year's greatest single influence on the water supply and sanitation components of construction.

But whether in this first year of enactment this new law and its $50-million-a-year grant program was an influence for good or for evil remained a moot point.

The fact is, when you look at the figures for dollar volume of contracts let in the sewerage field, the greatest plus influence of 1956 was Pittsburgh's (Allegheny County's) nearly $80 million worth of work awarded in January. This great burst of activity had 1956 well started toward being a $600 million year of contracting for the construction necessary to pollution abatement.

Then came the new federal law, and communities all across the country admittedly sat back to see if they were to get federal aid. While they awaited federal money, every other kind of money became tight. Result was a slowdown in sewerage contract awards as the year went along.

Of course, the record $579 million worth of sewerage work let to contract in 1956 is a vast and encouraging improvement over the $402 million of 1955. But when you consider that Pittsburgh alone accounted for some $80 million of the $177 million increase, the picture for last year is not quite so bright as it might have been.

The promise of federal aid that did not come was the greatest minus influence on rate of construction starts in '56. It was a year for creating and starting up the machinery by which $50 million a year should be granted to those communities that really need it and should be spent on construction that could not feasibly be started without it.

• **Aid yet to come**—Now, most of the machinery for federal aid is in order. The federal government has prescribed propriety criteria to be met by qualifying projects. The states have assumed responsibility for and are arriving at ways for determining priority among projects they certify as being proper applicants for federal grants in aid.

This year, 1957, will be the first full year in which to observe how the aid program works. There was $50 million appropriated for use in the fiscal year ending this June; an equal amount is budgeted for the fiscal year starting then.

Funds will be apportioned among the states according to a formula based on both population and per capita income; 30% of the project cost to a top figure of $250,000 is the aid-per-project limit.

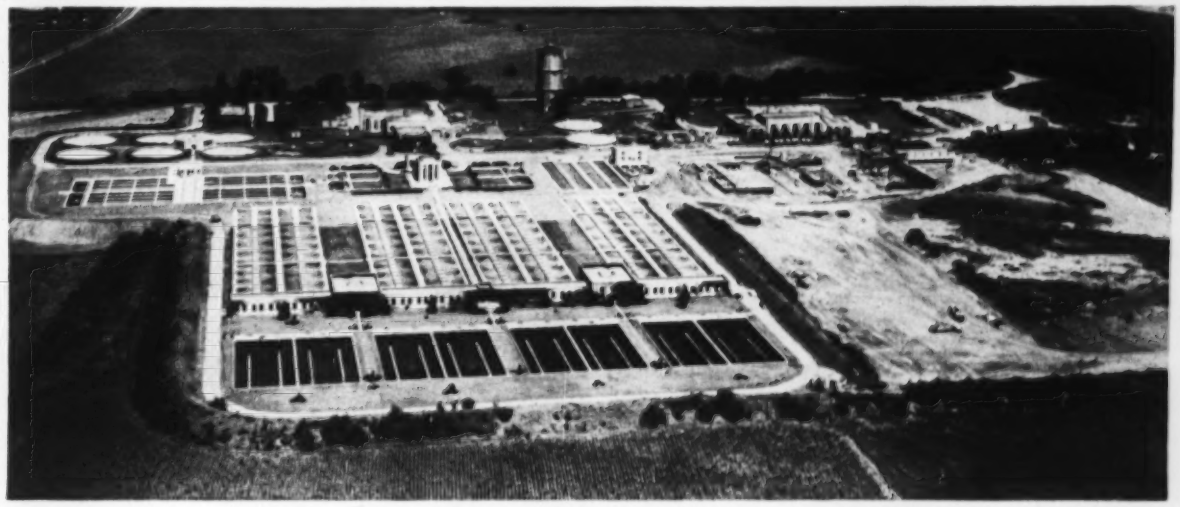
The first small grant was made barely before 1956 ended; the program is not yet rolling; its effect remains to be seen. But if it does no more than offset effects of the tight money market on construction in this field, sewerage ought to rack up another record year in 1957, hitting the magic $600 million mark if all goes well.

• **Waterworks: Another record**—Waterworks construction moved along through 1956 to a somewhat less spectacular new rate of contract awards than did sewerage, but it was a new record none-the-less. The $356 million in waterworks contracts for the year was 13% ahead of 1955's previous record-rate of $314 million per year.

In the waterworks field, unlike sewerage, there was no spectacular influence on construction, such as federal aid. Nor was there any single project—as Pittsburgh's sewerage job—to stand out from all the rest as an influence on total figures. Chicago's 960-mgd Central District filtration plant was under way (three times bigger than the city's now record South District plant), but contracts for this $85 million facility were being awarded on a piecemeal basis rather than all at once. (Reason for this difference is in the financing: Pittsburgh had to take bids on all $80 million worth of its sewerage construction at once to see if cost was going to be within its $100 million bank loan, now being repaid as revenue bonds are sold.)

The biggest water supply jobs of 1956 in terms of dollar value of contracts awarded were Denver's $101 million diversion beneath the continental divide, on which $48 million worth of work was let, including 23-in. Roberts Tunnel; and New York's $140 million Cannonsville diversion of Delaware River water, on which $48 million worth of work was underway on the 44-mi West Delaware Tunnel.

• **State activity intense**—Just as the fed-



Even Bigger

eral law and its aid provision is to influence sewerage construction, it now seems evident and imminent that state laws are to have great impact on waterworks construction. State interest grows intense in legislation for the control and development, including financing, of water resources both above and below the ground (see also p. 151). California, Texas, Ohio, North Carolina and Tennessee appear in the vanguard, but a score or more of other states are concerned with legislation, studies or plans to insure proper use of the water available among the rightful users of it. This concern has been intensified by continued drought over the central states, by advance of supplemental irrigation in eastern states, and by the vast growth in water used by industry everywhere.

Whether by state programs, or by whatever other means, new water supplies will be financed and developed only as the water users and voters are made aware of the value of water. For too long the public has been buying "too cheap water" and only now is it being made aware of the false economy. Drought and localized shortages have helped bring about this realization.

The California water plan, (see also p. 151), is striking evidence of what people will buy when properly educated as to the full value of water. This overall program has been price-tagged at up to $14 billion. An overall, long-range plan it will, of course, be bought and paid for only a piece at a time, but you can look for a start on its financing and construction this spring as first contracts for Oroville Dam are let. A definite part of the plan as envisioned, albeit a later part, is state financial aid to municipalities for the development of public water supply systems.

And in Texas, where cities in general are not so seriously short of water as are irrigators in the current, sustained drought, a $100 million state bond issue is proposed as a fund to finance municipal waterworks. Texas is a leader among the states with its developments of water supply by joint municipal-industrial interests. And it is among the states with the most to be gained by joint federal-local river development.

• **The need for partnership**—In the past there has been much river control work done at the actual expense of both water supply and sanitation. When dams are built for flood control with dam-height sufficient to permit storage of water for conservation, it is a less than full development and water suppliers have been hurt. When dams are built for power with discharges withheld to the detriment of dilution waters downstream, it is a development that penalizes pollution controllers unjustly.

There now appears to be more cognizance of these injustices at all levels of authority and many future federal projects will likely be partnership arrangements in the full sense, wherein local interests are provided for in design and local financing is arranged for in construction.

Just how far and how fast we might progress toward this ideal in 1957 will depend on whether federal legislation enabling consideration of local needs (water supply in Corps of Engineer projects, for instance) is passed. It also depends on whether, after years of discussion, a water resource advisor may at last be established in the white House as coordinator of the several Executive Branch agencies concerned with water. Such a coordinator was recommended most recently in the Eisenhower presidential water policy statement sent to Congress last January. But such a coordinator was also proposed in the Truman version of a water policy, and nothing came of it.

• **Distance no factor**—Last year saw continued the trend toward reaching far afield for water supplies and designing them for farther into the future. Water resource planners today quite generally keep their thinking geared past year 2000. And there seems no limit on how far they go in their plans for transmitting and distributing water.

The ambitious California Plan—while more for irrigation than for public water supplies—is an example of how water project planning has burst any limits previously imposed on its scope. From the planned Oroville Dam to Southern California, it is 400 to 500 mi.

Denver will be stretching some 50 mi to the west for water from the Rockies' West Slope. New York, committed to supply neighboring Westchester County, now has 44-mi West Delaware tunnel being built. It extends to the northwest, upstream of both the 25-mi East Delaware Tunnel and the 85-mi Delaware Aqueduct—world's longest tunnel. Baltimore plans to go over 30 miles to the Susquehanna River for an added upland source, a "firm up" source which will permit otherwise risky drawdown of nearer, gravity-flow sources.

In Detroit, while surrounding Wayne County has been advised to seek relatively pure water midstream in the elsewhere polluted Detroit River, there is still under study a scheme to go to Lake Huron for future water for the entire metropolitan area. And in Texas, Ft. Worth plans for the long haul to go 127 mi to the northeast for water.

CONSTRUCTION WAS 17% ALONG by year's end on the $100-million interceptor and treatment plant project of the Allegheny County Sanitary Authority—Pittsburgh and its suburbs.

Primary treatment plant (left) will handle 150-mgd of sewage; tunneling (right) is necessary for 33 mi of the 67 mi of interceptors.

Quite the reverse of piping water in from great distances, Chicago had plans last year for transmitting it out from its downtown source (Lake Michigan) to suburbs within a radius extending nearly 40 miles. A $300 million expansion is prescribed.

• **Regional efforts still gain**—In sewage collection and disposal as well as in water supply and distribution, the cooperative regional effort continues to gain favor. Pittsburgh's plant, financed in cooperation with 69 surrounding communities, is exemplary. Philadelphia just recently has contracted to take and treat sewage from adjacent communities. South Charleston, W. Va., has a 40-year pact with Carbide and Carbon Chemicals Co. calling for the company to handle the city's sewage. A similar agreement was reached last year between American Cyanamid Co. and the Somerset-Raritan Valley Sewerage Authority in New Jersey.

Pollution control downstream in the Raritan Valley, by the Middlesex County Sewerage Authority, continued in the news all last year—not only as a significant regional effort but as a $22 million construction project featuring unusual materials and methods. It is the first big and truly competitive use of corrugated steel pipe for a trunk sewer project. As such, it has been a job with lots of headaches for both engineers and contractors, but if there are any insurmountable problems—reasons why this type of pipe should not stay in competition with others—they would be problems of performance, and have yet to appear. For the outfall in relatively shallow Raritan Bay, the corrugated metal pipe—although 84 in. in dia—lent itself to being payed off a barge almost as a cable.

• **Hyperion being revamped**—Not so simple will be the outfall construction at Los Angeles Hyperion sewage treatment plant, the plant that will be converted from secondary back to primary treatment in its current $60 million expansion.

Almost $20 million was obligated in 1956 and almost all the rest will be contracted this year. Much of the program—more than half—will provide badly needed new main trunk lines, interceptors and relief sewers. But greatest interest centers on modifications to the existing treatment plant.

To expand its capacity from 245 mgd average flow to 420 mgd, the plant is being converted from high-rate activated sludge to primary treatment. Making this possible are outfalls extending farther and deeper into the ocean than even before. The 12-ft dia effluent outfall will go 5¼ miles offshore into water 200 ft deep, and the 2 ft dia sludge outfall is being carried 6¼ miles out to water 300 ft deep. One purpose of such outfalls is to eliminate the necessity for costly daily disinfection.

Disposal of such huge quantities of sewage so far offshore is a new technique.

Much detailed study has been devoted to the plan. City officials are satisfied that it will provide the best treatment for the least amount and still adequately safeguard the waters of Santa Monica Bay. To make sure of this, however, the State Water Pollution Control Board has directed the city to establish a positive and regular system of monitoring the waters and beaches of the Bay. The die is now cast as far as Los Angeles sewage treatment is concerned. The city seems satisfied it chose the right course in its decision to convert Hyperion. It will take at least two years to find out.

• **Few spectacular process advances**—Although the change in process at Hyperion remained much in the news through 1956, it was not a particularly active year for advances in treatment techniques. Biggest news of all, perhaps, was the introduction of first one, then a second European process for treatment of the industrial waste from steel-making known as pickle liquor. It appears that another one of the remaining knotty industrial waste problems might soon succumb.

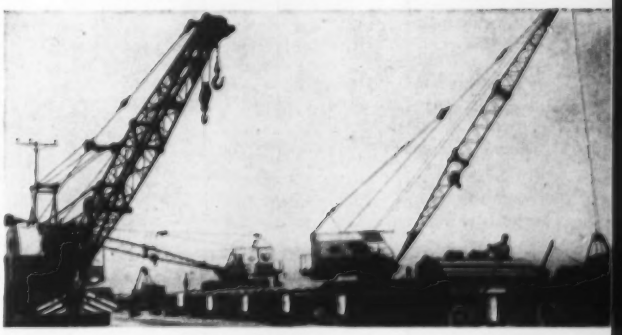
Perhaps there might have been more process development in '56 if more research were being done in the general field of water supply and sanitation. Paradoxically, there is more money available for research here than there are men to do it. And there abound many challenging problems—like how to control evaporation losses from lakes, how to get fresh water from salt water economically, and too many others even to mention.

But if the problems remaining loom large, the body of knowledge based firmly on solved problems also looms large. There is reason for optimism. Although the progress of earlier years in abating water pollution and erasing water shortages was often painfully inadequate, 1956 was a brighter year by far. And from all indications, 1957 will be even brighter. This is the year the Federal Water Pollution Control Law will truly go into effect. It will be a year marked by continued progress toward clean-up of our major rivers. It will be a year of action by the states on water matters vital to them. And maybe, it will be the year the U.S. finds a national water policy.

Lima Type 604 lowering pile into position on the Manahawken Bay Bridge, Ocean County, N. J.

Lima Type 604 dredging sand from single-cell cofferdam prior to driving piling.

LIMAS proved to be everything Brann & Stuart wanted in heavy-duty precision-type cranes



Lima Type 34-T (left) and two Type 604's, part of the Brann and Stuart Company's team of eight Limas.

Says *Amos Rogers, Jr., president* of Brann and Stuart, Philadelphia, Pa., "We purchased our first Lima machines in 1950, and they proved to be everything we were looking for in heavy-duty precision-type cranes. In 1952 we purchased two additional Lima rigs, and, right now, we have a fleet of eight Limas, made up of 2 Lima 34's, 2 Lima 34-T's, 3 Lima 604's and 1 Lima 703-SC.

"Our operating people like the Lima ease of operation, and they have proved very economical to run. Our distributor has given us excellent service on these machines whenever we have needed it."

Brann and Stuart's contract calls for construction of 16 piers and 2 abutments for the Manahawken Bay Bridge job, Ocean County, N. J. The work involves building large cofferdams for founding these elements. It is here that the Limas, with their high maneuverability, come into use, dredging the sea bottom to the necessary depth. Read what Mr. Rogers has to say about how they are performing: "It is on this type of work that our Lima machines really excel for us. You may be sure we have been very well pleased."

This contractor's experience is typical of many others—get to know Lima quality, and you'll want more of them working for you. It will pay you to get complete details on the Limas with capacities best suited to your job requirements. Call your nearby Lima distributor today, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

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FROM SOUTH BOSTON to the planned Deer Island Treatment Plant, the 8-mi-long, 10-ft-dia Boston Main Drainage Tunnel is expected to be finished by September of this year.

• **Baltimore (Water)**—The $12-million, 120-mgd **Ashburton Filtration Plant** went into operation in April of last year, completing development of Baltimore's second independent water source. A $45-million bond issue for development of the third source was passed last November and work should start late this year. It will comprise a 38-mi, 108-in. pipeline from the Susquehanna River to the Montebello filters and a pumping station at the source.

Baltimore, in 1956, also continued relatively heavy expenditures on its distribution system, part of a $20-million program of reconstruction and enlargement by 1962.

• **Boston (Sewerage)**—The Boston Metropolitan District Commission's $75-million sewerage program is well under way.

What will be the world's largest sewage plant, the **Deer Island Treatment Plant,** is expected to be started early this summer. The plant will have a capacity of 500 mgd, considerably in excess of the 300 mgd of sewage pouring into Boston Harbor from 33 metropolitan communities. Under the MDC's $50-million consolidation plan, when Deer Island is completed 2½ to 3 years from now, the Moon Island discharge center will be abandoned.

Part of this whole new system are connecting links that will clear at Deer Island. The main drainage tunnel is now holed through for 7 mi and is 50% lined. Final completion is scheduled for August of this year. Total cost will be $12 million.

The 4-mi-long **Metropolitan Relief Tunnel** from Chelsea to Deer Island was finished early last month. The 10-ft-dia, 350-mgd tunnel cost $6 million.

The **Boston Main Drainage Tunnel,** 8-mi-long and 10-ft-dia, from South Boston to Deer Island, is now 85% complete and is expected to be finished by September 1957.

The **South Charles Relief Sewer,** a 36 to 72-in. precast and cast-in-place pipeline, is 95% complete. A soft-ground tunnel section, not yet advertised, remains to be built.

• **Boston (Water)**—A 7-mi-long, 10-ft-dia water tunnel, the **City Tunnel Extension,** is now 50% finished and scheduled for completion by September this year. The 60-in. pipeline connectors are about ready for advertising; some delay has been met here.

A $20-million pressure tunnel from Wachusett Reservoir in Clinton to the Marlboro pressure tunnel—which connects with the Norumbega Reservoir, key to Greater Boston's water supply—is expected to be started in the spring of 1958. The legislature has passed a measure providing a bond issue to build the 9-mi-long, 14-ft-dia tunnel.

• **Charleston, S. C. (Water)**—A 2-bgd water supply is now available to Bushy Park, with completion last year of a $3-million dike and canal. The 3.3-mi canal diverts upstream Cooper River water into the Back River, and a 5,830-ft-long, 50-ft-high marl dike downstream across the Back River prevents salt-water intrusion. The resulting reservoir is fed by up to 10 bgd of release water from the Santee-Cooper Power Authority dam 40 mi upstream.

• **Chicago (Sewerage)**—The 1957 improvement program of the Metropolitan Sanitary District of Greater Chicago calls for the construction of $9 million worth of sewers, $5.3 million worth of sewage treatment facilities and $1.1 million of improvements at a pumping station. This will be more than twice the size of last year's program when $6.3 million worth of this construction was placed under contract and $6.8 million completed. Projects to be started this year include 10 big interceptor sewers, and improvements at the three sewage treatment plants: **Calumet, Northside,** and **West-Southwest** plant. Last year, construction was begun on six big interceptor sewers, to cost a total of $4.6 million. Chicago's Department of Public Works also has a big sewer program for 1957, costing in the neighborhood of $20 million. Last year the department awarded contracts for 19 mi of new sewer in 11 separate projects to cost $13 million. Three projects have been completed.

• **Chicago (Water)**—Chicago's program for an abundance of pure water was featured by work on its $85-million, 960-mgd **Central District Filtration Plant** being built in Lake Michigan just north of Navy Pier. The 6-mi, $12.7-million tunnel system for this plant was 18% finished at the end of the year. A $3.9-million contract for the plant's 68-mg reservoir is 75% finished. A contract for eight big pumps for the filtration plant was awarded last year for $1.5 million. They have a combined capacity of 1.9 bgd. Another big contract awarded by the Department of Works last year for construction of the 5-mi, 79th St. water tunnel at a cost of $7.8 million, was 3% completed at the end of 1956.

• **Cincinnati, Ohio (Sewerage)**—The $47-million **Mill Creek Sewage Works** kept advancing in 1956. During the year, $3.5 million was awarded for the sludge disposal building which is now about 20% complete. Also under way are the $503,000 **Boldface Sewage Pumping Station;** interceptor sewers, sections 1, 2, 3 and 4 for a total of $4.7 million; and Eggleston Ave. sewer for $321,000.

Projects about 50% complete at year's end are sludge digestion tanks, administration building, power house and service building—which includes three 2,000-hp dual-fuel engines connected to 1,350-kw generators to supply power for the works.

In 1957, the city will take bids on projects totaling $12½ million. Contract No. 7 of this total will be for $7 million. Work will include pump building, nine 40-million-gallon pumps, six 40-ft-square grit chambers and six 54-in. grinders which are the largest that are made. Bids for this contract will be taken in March.

In August, bids will be called on the last major contract for the sewage works. It will be for $4½ million and involve primary settling tanks, chemical building and sludge pumping building. In hand with this work will be a $1 million project known as Muddy Creek east and west interceptors. Work will consist of about 4 mi of 30, 24, and 18-in. pipe.

Also bids are now being called for section 5 of the **East Branch Ohio River Interceptor.** Cost is estimated at $600,000.

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"Nothing to it—Install a MORETRENCH WELLPOINT SYSTEM and Go Ahead—IN THE DRY!"

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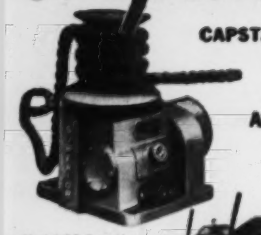
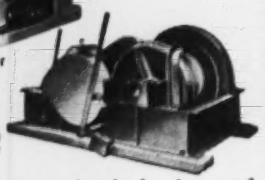


CAPSTAN TYPE, DRUM TYPE AND SPECIAL TYPES



Model SC Superior Capstan Carpuller

Model EP Drum Type Carpuller

One man can move hundreds of tons of rolling load with practically no effort. Economical, efficient, Carpullers are available for your specialized requirements.

Write for New 24 page Bulletin C-616 "Carpullers for Easy Moving of Rolling Loads"

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Main Office and Works: SUPERIOR, WISCONSIN, U. S. A.
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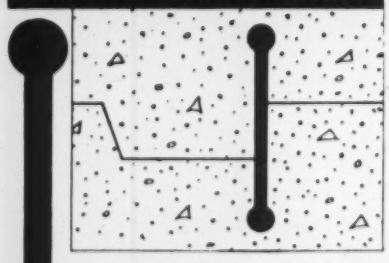
RUBBER
WATERSTOPS
FOR MASONRY CONSTRUCTION JOINTS



Williams Efficiency Waterstops are made from Natural Rubber Stock, and designed for maximum effectiveness in any type of cast-in-place construction joint. They will bend around corners—will not tear from shear action. Tensile Test: 3990 lbs.; Elongation Test: 650%. Available in rolls up to 80 feet in length. Field splicing is simple. Williams Waterstops can also be furnished in Neoprene for industrial uses where resistance to oil and other injurious wastes is desirable. These highly effective Waterstops are now in use in hundreds of industrial plants, commercial and public buildings throughout the country.

See Sweet's, or Write for Information.

WILLIAMS
EQUIPMENT and SUPPLY CO.
17928 Kinross, Birmingham, Michigan

SUBSTRUCTURES FOR FILTERS at the new $22 imillion Torresdale (Philadelphia) filter plant take form. Rapid sand filters will replace present slow sand filters of old plant.

• **Cincinnati, Ohio (Water)**—The city, late last year, awarded contract for a water distribution center to cost about $2.4 million. Cincinnati also spent $1.1 million in expansion of water mains during the year. In 1957, about $2 million will be spent for water main expansion.

A pumping station to cost about $6.7 million is also projected for 1957, plus $1.7 million for a booster station.

• **Cleveland (Sewerage)**—Continuing a general capital improvement program, Cleveland is planning to spend $3.5 million for sewer improvements in 1957. Of this, $2 million will go for flood relief sewers and $1 million for a low-level sanitation system in the Cuyahoga Valley; the remainder will be used for new sewer construction. During 1956, $2.2 million was spent.

• **Cleveland (Water)**—The city has budgeted $7.4 million for major water supply projects in 1957. Of this, $5 million will cover last contracts on the $22-million **Clague Water Plant,** which is now 40% along and scheduled to be completed in 1958. The remainder will go for new water mains and pumping station improvements.

The Clague plant—which features chemical precipitation, rapid sand filtration and flouridation—will produce 50 mgd for an adequate water supply for Cleveland's west side and adjoining westerly suburbs for the next 20 years.

• **Cocoa, Fla. (Water)**—A $7.8-million project to bring water to the Cocoa metropolitan area from wells 32 mi west of the city was started last June, is scheduled for completion this June. Five contracts awarded in 1956 include laying 32 mi of 36-in. pipe and 11 mi of 24-in.

• **Columbus, Ohio (Sewerage)**—With $2.2 million worth of improvements under way, and $3.5 million already completed, Columbus will let new contracts during 1957 to increase capacity of the **Scioto River Sewage Disposal Plant** to 120 mgd. Altogether, the city will have spent $11 million to increase capacity from the plant's original 50 mgd.

Also, a $2-million **Alum Creek trunk** sewer is being built in the city's east side.

• **Columbus, Ohio (Water)**—The city gave finishing touches to $24-million Hoover Dam, which is now storing 19.7 billion gallons of water. Gates are expected to be added to bring storage capacity up to 27 billion gallons.

• **Denver (Water)**—In 1956 the Denver Water Board placed under contract more than $48 million worth of work authorized by a $101-million bond issue voted in 1955. Major item is 23-mi-long **Harold D. Roberts Tunnel** under the Continental Divide. Work started last July on this $40-million unit and is progressing on an around-the-clock basis. Crews are working at both the east and west portals and two more faces are to be opened by mid-1957 from a vertical shaft now being sunk. Project is due for completion in 1960. It will bring an estimated additional 148,000 acre-ft of water annually to Denver from Colorado's western slope.

Boring of the 3.2-mi-long, $3.4-million **Vasquez Tunnel** started at year's end. With related projects it will add 50,000 acre-ft to Denver's water supply by spring of 1958.

Linked with the Vasquez Tunnel is a $4.6-million project to put up a 180-ft-high concrete arch dam across the **Williams Fork River.** The dam will create a reservoir to store 93,637 acre-ft of water.

NOW!

Freedom from pumping failure!

SELF-PRIMING

Important announcement to pump users! Here is a pump that never fails, never quits. Solids do not foul this pump. This new Gorman-Rupp design has *straight-in* suction. Pumped liquid enters direct to the eye of the impeller—increased capacity, higher efficiency, higher lift. Simpler. Fewer parts. Now available in sizes 1½", 2" and 3".

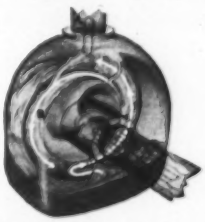
You saw it in action at the Road Show

GORMAN-RUPP

New "80 Series" Pumps

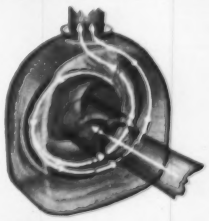
PUMP AT REST

Captured liquid retained for priming. Note the absence of the usual check valve.



PRIMING ACTION

Entrained air (B) escapes at (A) to be discharged. Priming liquid returns (C) to entrain more air.



PUMPING ACTION

Straight-in suction voids entrance restrictions. Water enters direct to eye of impeller.

CHECK THESE NEW-DESIGN FEATURES!

- Straight-in suction
- No check valve
- Lighter in weight
- Long-life mechanical shaft seal

Engine or motor driven. Base or wheel mounts.

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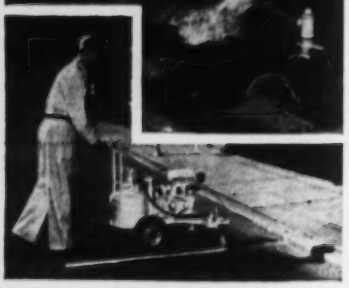
help keep performance up··· costs down



Wherever power equipment is used in construction, you'll see a steady increase in the number of Kohler Engines giving sturdy, reliable, cost-saving service.

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AIR-COOLED ENGINES • PRECISION CONTROLS

Just started is a $1.6-million project for cleaning and lining the 6.3-mi-long **Moffat Tunnel.** The work, due to be finished by April, 1958, will give the tunnel a uniform diameter of 10 ft 6 in., and boost its carrying capacity from 600 to 1,300 cfs.

• **Detroit (Sewerage)**—At the 75% mark is the **Conant-Mt. Elliott** relief sewer. The $15-million project was started in April 1955 and should be finished by spring of this year. This month, work will start on the **West McNichols** storm relief sewer. The 3.9-mi, 11- to 15-in.-dia pipe job will cost $7 million and involve tunneling for almost its full length.

• **Detroit (Water)**—The $31-million **Northeast Pumping Station and Treatment Plant** and raw water tunnel went into operation last year. It is rated at 192 mgd. Additions and renovations to the **Springwells Pumping Station,** a raw-water booster station, will run to $20 million. Excavation has started and contracts have been let for the waterworks caisson.

• **Fort Worth, Texas (Sewerage)**—The Public Works Department awarded three major contracts last year for a total of $2.2 million. Largest contract for $1.5 million went for the **Village Creek Sewage Treatment Plant.** Two contracts for the **Village Creek collector,** to be completed this year, totaled $700,000. In addition $300,000 was awarded in sub-mains and laterals.

This year, $900,000 will be awarded for projects including the **North Side Collector** at $650,000 and the Village Creek Collector. Also, contracts will be let for $300,000 of miscellaneous mains and laterals.

• **Fort Worth, Texas (Water)**—Last year 17 major contracts were awarded by the water department for a total of $3 million. Four of the projects were completed at a cost of $684,000 and the remaining 13 will be completed this year. Major contracts to be completed this year include $197,960 for the $4-million **South Holly Plant,** which will be completed in 1958; $266,042 for a 72- to 78-in. raw water line for the plant; $933,000 for pumps, switch gear, 42-in. pipeline, valves and sluice gates for the **Brazos River** emergency supply program.

Two contracts for the **Westside** main and service facilities started in 1955 were completed in 1956 at a total cost of $789,248.

This year the water department is planning to contract for $3.5 million. Major work planned includes $1.4 million on 36- to 48-in. mains; $335,000 for two pump stations, $187,000 for a low lift pump station for the South Holly plant; $733,400 for pipeline, intake and booster pump station contracts for the Brazos program.

• **Jersey City, N. J. (Sewerage)**—A $30-million sewage interceptor and treatment plant

BUILT-IN NON-SKID SURFACE

Now Relgrit grating and safety treads bring you the advantage of an open floor—and reduce the threat of expensive skidding accidents, too.

Relgrit's surface is skid-proof because it is coated with a non-absorbent abrasive, ALUNDUM*. This abrasive is permanently bonded with tough, strong Epon Resin, a product of Shell Chemical Corporation. The chemical-resistant surface stays permanently safe under all working conditions—wet or dry . . . muddy or oil-soaked.

*Trademark of the Norton Company, Worcester, Mass.

Relgrit

Patent Applied For

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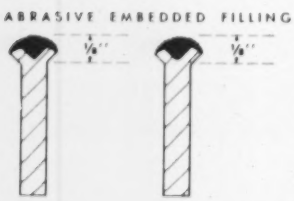
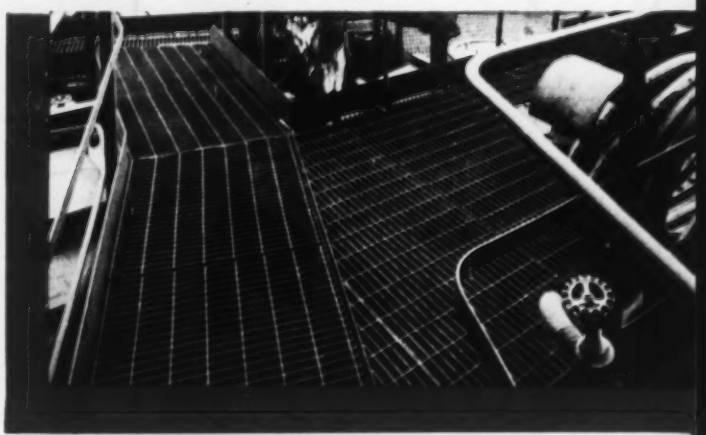
For the advantages of an open floor plus permanently *sure footing* the only answer is Relgrit

Relgrit is being used in major industrial plants such as atomic energy installations, chemical plants, oil refineries and many others of every description. After three years of extensive use, these firms found that it's practically impossible to lose footing on Relgrit surfaces. *Even when these surfaces are covered with water, mud, oil or grease!*



Abrasive grains are embedded in a "V" groove at the top of steel bars. Permanent bonding of Relgrit surfaces is assured by new Epon Resin, a product of Shell Chemical Corporation.



For Durability and Safety

Relgrit is extremely tough and durable, having greater wear resistance than steel and 32 times the wear resistance of 1-1.5-3 concrete. Relgrit has an adhesion to metal of 1000 pounds per square inch, a tensile strength of over 3500 pounds per square inch, and a compressive strength of more than 19,000 pounds per square inch. Relgrit is not affected by the most commonly used acids, alkalis or chemicals.

The abrasive surface of Relgrit is actually non-skid . . . not to be confused with the relatively smooth and ineffective serrated surface furnished on other types of grating. In addition Relgrit retains this abrasive skid-resistance permanently.

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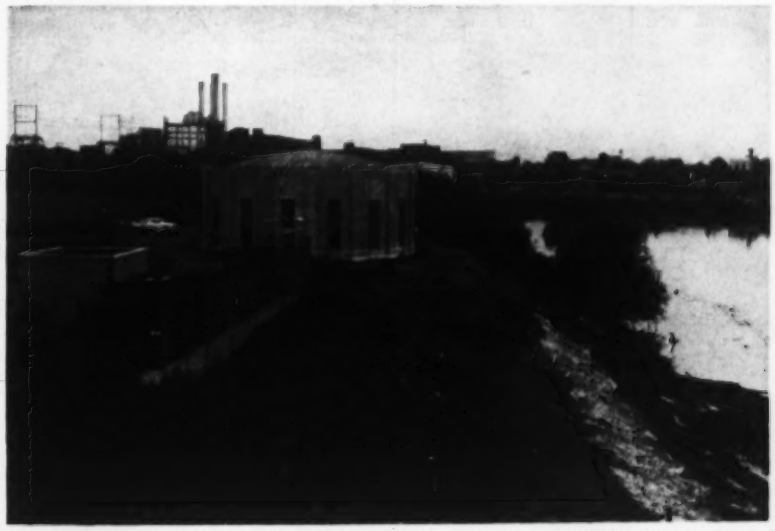

PUMPING STATION pushes sewage that once poured into Philadelphia's Central Schuylkill River to Southwest Sewage Treatment Plant.

started in 1954 is expected to be completed by July of this year. Two primary treatment plants, one treating the eastern half of the city and the other located in the western part, are almost completed.

Fifteen miles of 24- to 96-in-dia reinforced concrete pipe have been going in, with quite a bit of tunneling necessary. Some trouble has been met in tunneling through soft ground. The two plants are connected with an electrical conduit, and a twin 6-in. cast-iron sludge main through which raw sludge will be pumped from the eastern plant to the west plant for digestion.

The program is designed to control city-generated pollution of both the Hudson River and Newark Bay.

• **Kansas City (Water)**—Metropolitan Kansas City, which encompasses most of five counties—three in Missouri and two in Kansas—has access to plenty of water. Distribution and purification are its main concerns.

Kansas City, Mo., expects to have ready by the end of this year an improved distribution system whose capacity will have been doubled to 210 mgd.

Expansion of Kansas City, Mo., waterworks is also going on with final cost set at $16.6 million, of which $13 million have already been spent. Distribution projects will cost nearly $22 million, with $2½ million spent so far. A new pumping station, Turkey Creek, is nearing completion at a cost of $5.7 million. On high ground, it replaces a major unit temporarily knocked out in the 1951 flood.

To back its huge construction program, Kansas City, Mo., voters have approved bond issues totaling $52 million in four parcels from 1951 to 1956.

In Kansas City, Kansas, the Board of Public Utilities completed the second half of a water flow line from the Missouri River intake at a cost of over $10 million. Also a 13-million-gallon reservoir is being roofed at a cost of $400,000. It has diameter of over 400 ft.

• **Los Angeles (Sewerage)**—Construction got under way on a sewage works program financed by a $60-million bond issue voted in 1955. Work centers on modifications of existing Hyperion Treatment Plant, including addition of an ocean outfall for sludge. It also includes substantial interceptor sewer work.

Of $20 million in interceptor and relief sewers being designed by the city, $5 million was under construction at the end of 1956. Most of the remainder will be placed under construction this year, with all interceptor construction scheduled for July 1958 completion.

Some $40 million of outfall, treatment plant modification and main trunk sewer work is being designed by Hyperion Engineers, Inc., a joint venture of three L. A. firms. All major design work is complete and $14 million in contracts have been awarded. This includes 8 mi of main trunk sewer known as the **North Central Outfall Sewer** for which one $6.2-million contract and another $4.9-million contract have been let. The 9½-ft-dia sewer includes 5.4 mi of tunnel and 2.6 mi of open cut.

Also awarded in 1956 and nearly completed at year's end was an $87,360 sludge pumping plant.

Final job awarded in 1956 was a $2.6-million contract for the sludge ocean outfall. This 2-ft-dia pipe will extend 6½ miles to sea and terminate in 300 ft of water.

Largest of the remaining units to be bid—early this year—is a 12-ft-dia, 5½-mi-long effluent ocean outfall. Engineers estimate

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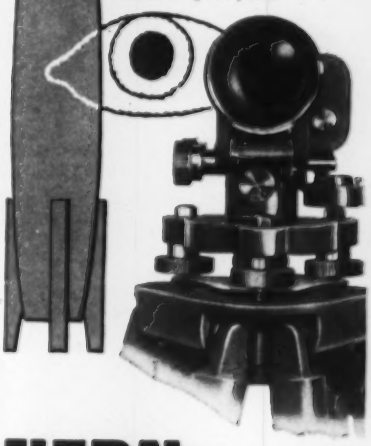

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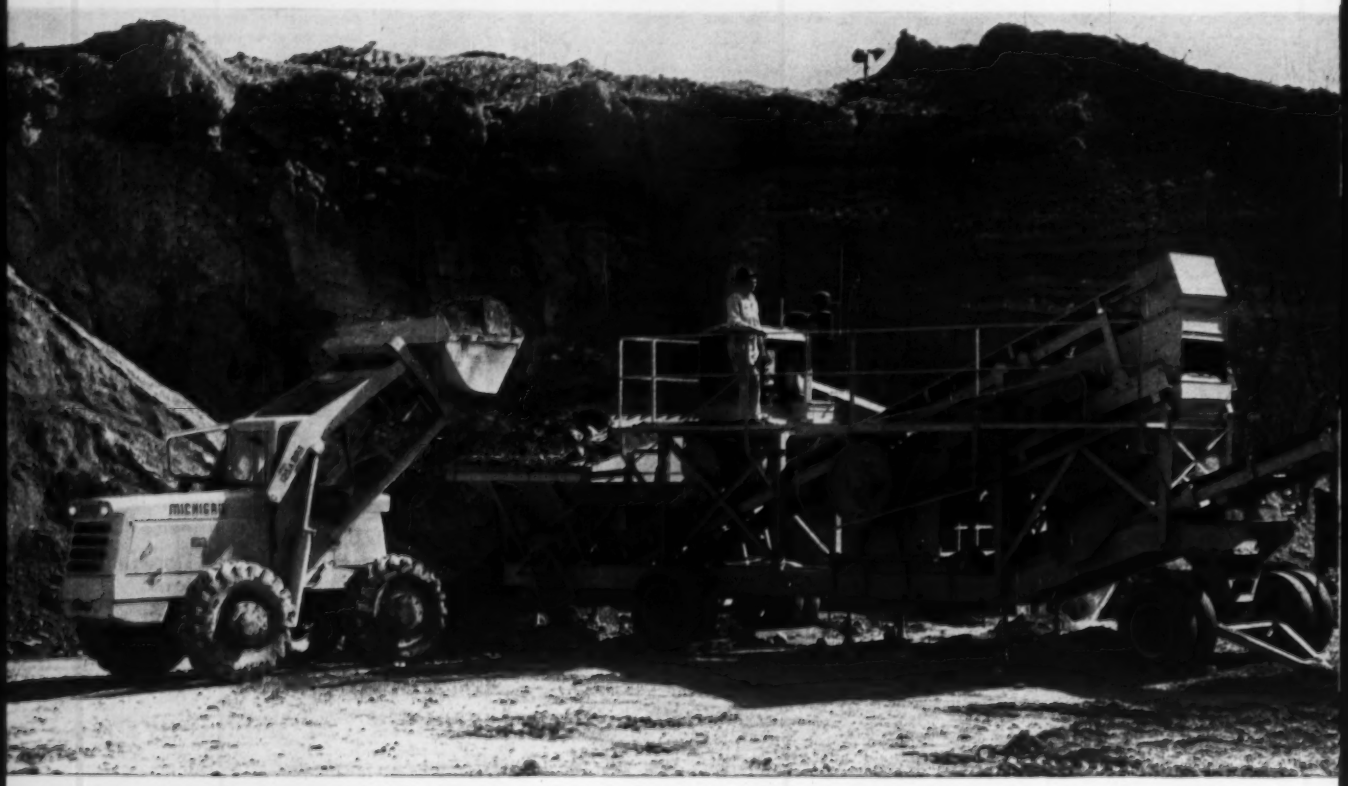
SOME UNUSUAL WAYS

Michigan Tractor Shovels are saving time and money for paving contractors around the country



Feeds portable crusher—Making good use of its high lift, Michigan Model 125A digs and dumps raw bank gravel into hopper of 100-ton-per-hour base material plant. Photo comes from Southern Hills Inc. pit near Dayton, Ohio, where the 2 yd Michigan did the work of a more expensive, less versatile, far less mobile excavator-crane.

Grades shoulders—Special side bucket attached to Michigan 175A grades 3 ft shoulder next to newly-poured slab. Unique rig does jobs not possible with grader drop-blade . . . including filling holes, distributing gravel, removing spoil. Attachment, designed by Villa Contracting Co, is helping widen 27 mi of N.J. Garden State Parkway.

Pours concrete—Hauling concrete in Michigan Tractor Shovel bucket, Slattery Rock Corp. solves problem of laying 6 lanes of New York's Deegan Expressway under low viaduct. Two of these maneuverable "buggies" needed only 4 hours, 200 to 250 trips to pour 800 ft of each 12 ft lane.

Carries pipe—One of Peter Kiewit's Michigans serves as all-around handyman on company's Indiana Turnpike contract. This 95 hp model lifts up to 11,000 lbs, carries 5,500 lbs at 4 mph. Note excellent all-around visibility given operator.

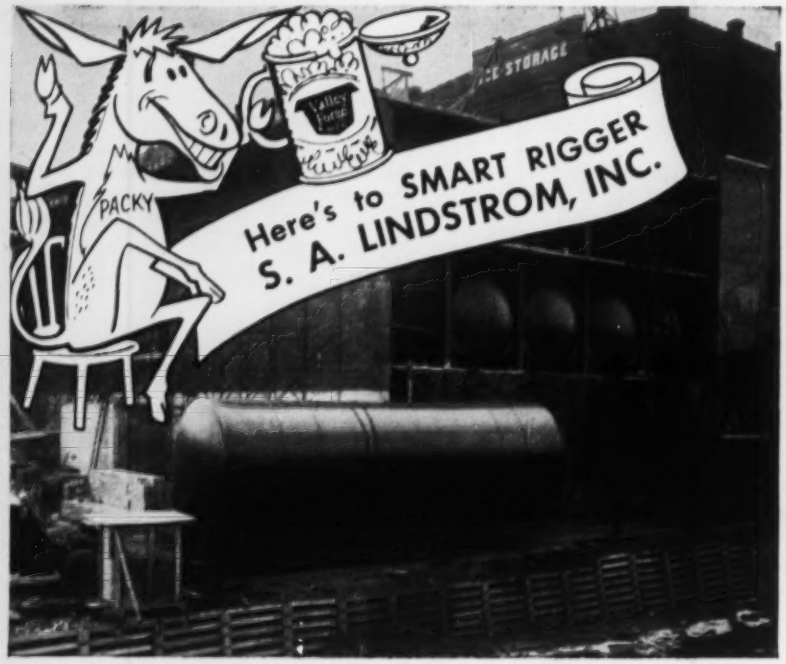
Breaks, loads asphalt—Before resurfacing street in Worcester, Mass., Contractor Charles. Chaffee uses 1¼ yd Michigan to strip old asphalt. No "ramming" is required—powerful breakout quickly shatters paving.

Cleans pavement—Highway must stay open said Nashville officials, so Wright & Lopez do cleanup with small, agile 16 cu ft Michigan. Only 4'2" wide, 10'8" long, unit works rapidly, doesn't block traffic, doesn't damage newly-set pavement.

Removes sewer cover — When other big loaders failed, Kirby-Erwood's 133 hp Michigan succeeded in prying off this 2-ton concrete cover. Assignment was part of cleanup before widening Los Angeles freeway.

Digs shot rock—Time studies proved to Nelson Bros., Reading, Kansas, that this 2¾ yard Michigan would outproduce crawler-loaders in both pit-run and shot rock.

Breaks, loads concrete—On Philadelphia city street repaving job, Union Paving Co. breaks and loads 4 to 6-inch concrete slab with this 2 yard Michigan Model 125A.



and his **ROGERS TRAILER**

Construction of the new buildings at The Adam Scheidt Brewing Co., in Norristown, Pa., included the pigeonholing of 30 steel tanks in the 3 story storage and fermentation cellar.

Problem: To move the 18 ton, 45 foot long, 12 foot diameter glass lined steel brewing tanks on a 30 foot Rogers Trailer.

Ingenious Solution: Two 45 foot I-beams bolted to the trailer bed. Cross-bracing beams formed a cradle for the tanks which were held securely by wire loops during the move. With this clever arrangement, the trailer's two rear axles fell almost exactly under the center of the tank. This made for better balance, smoother riding and easier handling.

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PUMPING PLANT lifts water 303 ft in Southern California's expanding water distribution system.

that this pipeline will run as much as $18 million.

To be bid early this year are modifications of the Hyperion plant to change from high-rate activated sludge treatment to primary treatment. This is expected to increase plant capacity as much as 50%; average capacity will be 420 mgd with peak of 720 mgd. Activated sludge treatment will also be possible in combination with primary treatment. Cost of this contract is estimated at $4 million and it includes new primary settling tanks, a new headworks building and the final 1,500 ft of the North Central Outfall Sewer.

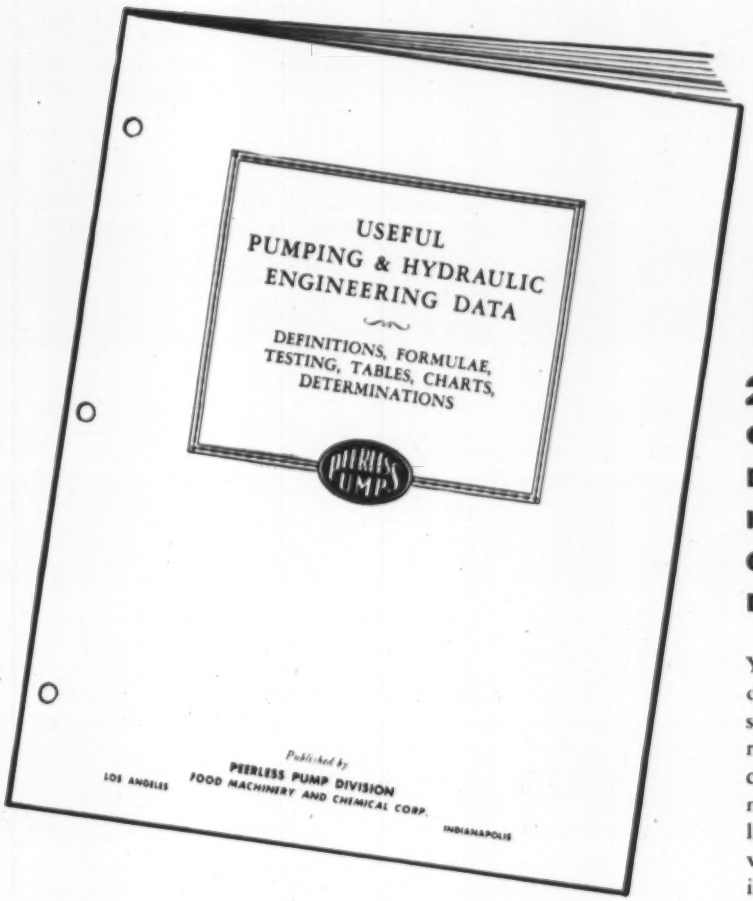
Designs have also been completed for more than $4 million of additional work, including a $3.7-million effluent pumping plant and $507,000 additional modifications to plant facilities. When these jobs are bid depends on availability of funds after contracts for the effluent outfall and plant enlargement are awarded.

• **Los Angeles (Water)**—Los Angeles Water & Power Dept. continued with its 5-year, $85-million program for extension of the water system, announced at the end of 1955.

The final 4,800-ft link of the $9.5-million **Eagle Rock-Hollywood pipeline** was finished in mid-1956. The conduit now extends the full 10-mi length from its connection with the Colorado River Aqueduct distribution system, at Eagle Rock Reservoir, to the Hollywood Reservoir. Started in 1952, it has been one of the major water distribution project for the department.

Contract was awarded during the year for the second unit of another major distribu-

Reserved for you – Mr. Engineer...



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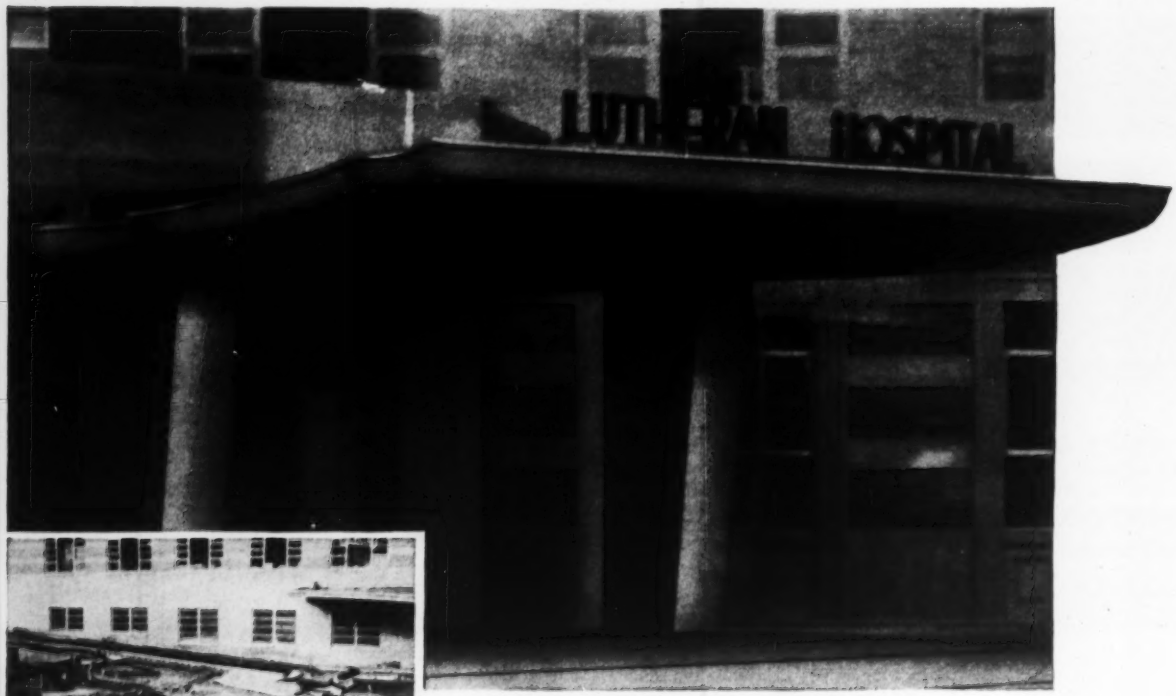

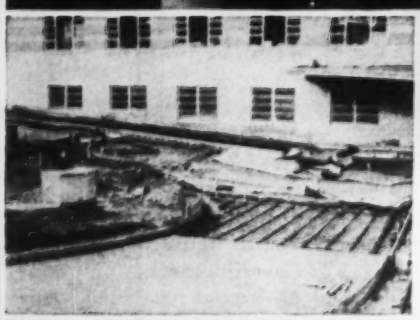

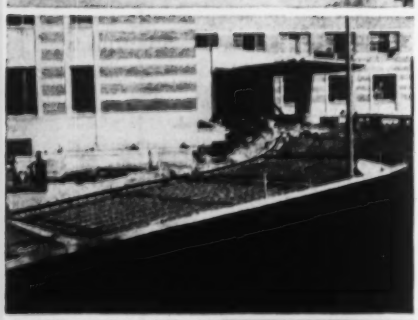

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Because instant access to hospital entrances at all times, in all kinds of weather, is so vitally important, many modern hospitals like this new Lutheran Hospital in St. Louis have installed Steel Pipe Snow Melting Systems in driveways, ramps and sidewalks.

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RESERVOIR . . . built by Tacoma Water Department . . . for Tacoma, Wash., cost $1.1 million, has 1 million gal capacity. Paving of reservoir went fast using long-boom paver and roller screed (ENR Dec. 13, 1956, p. 34).

tion line for greater Los Angeles—**the Granada Trunk Line.** Work should be under way before spring. The line is designated to serve the fast-growing western and northwestern part of the San Fernando Valley and is planned eventually to extend a total of 20 mi. A third unit, also scheduled for 1957, will bring the line to about half the total distance, at a cost of $3.5 million for the three units.

The $1.5-million **Dry Canyon Reservoir By-Pass Line,** a new section of the Los Angeles **Owens River Aqueduct,** was virtually completed in 1956.

• **Louisville, Ky. (Sewerage)**—Work started last May on a $5-million sewage treatment plant, and a $10.3-million interception to connect the plant with the city's present sewer system. Plant is designed for average capacity of 100 mgd and maximum capacity of 300 mgd. A square-shaped sedimentation basin has capacity of 170 mg and 3 digestion tanks have 2 mg capacity each. Treatment plant is scheduled for completion in April, 1959, at which time the interceptor is expected to be 34% finished.

• **Miami, Fla. (Sewerage)**—The city's $27-million sewage disposal system to clean up Biscayne Bay went into operation on September 21. Raw but chlorinated sewage started moving through the 14,350-ft-long, 72-in-dia force main to the $11-million, 47-mgd treatment plant on Biscayne Bay's **Virginia Key.** The plant employs no primary treatment; it uses a high-rate activated sludge process. Effluent is being discharged into the Atlantic through a 4,500-ft-long, 90-in.-dia. outfall laid in 20 ft. of water.

Less than one-fourth of the served area's units are connected with the present system and engineers figure it will cost $30 million to run lines to all units.

Health officials estimate it will take five years for Biscayne Bay to flush itself clean now that all the old outfalls have been sealed.

• **Middlesex County, N. J. (Sewerage)**—A $27-million cleanup of the lower end of New Jersey's Raritan River is over half completed. The project includes a 120-mgd pumping station and a 53-mgd (immediate capacity) chemical treatment plant; 16.3 mi of corrugated metal and concrete interceptor; 3.3-mi concrete and corrugated metal outfall discharging into Raritan Bay.

Operation of the treatment plant is expected by next October.

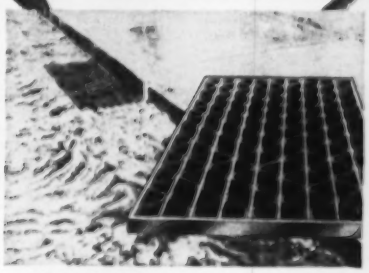
Use of the metal pipe for sanitary sewerage and laying subsequeous corrugated metal pipe are highlights of this job.

• **Nassau County, N. Y. (Sewerage)—Disposal District No. 2's** estimated $100-million, 12-year sewer program is now approximately 50% complete. The program features over 1,000 miles of sewers including interceptors and collectors for 10 different collection districts. Interceptors are already complete as is an $8-million, 27-mgd complete-treatment sewage plant. Started in 1950, the program is expected to be completed in 1962.

• **New Orleans (Sewerage)**—The New Orleans Sewerage and Water Board spent some $2.7 million for construction in 1956 and has scheduled projects totaling $5.3 million for 1957. Among major works in 1956 modification at the main purification plant, totaling $866,879; completion of the Algiers River Pumping Station No. 92 at a cost of $263,075; construction of 12¼ mi of sewers for $490,770.

• **New York City (Sewerage)**—The first stage of New York City's Pollution Control Program neared final completion during

FLOODED HIGHWAYS HINDER TRAFFIC



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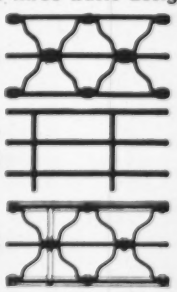

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Water Supply and Sanitation

1956. Work was continued on the last two projects of that stage—$7-million **Oakwood Beach Project** and $41-million **Bowery Bay Project.**

The **Oakwood Beach Plant** was substantially completed and went into operation in November. The **Bowery Bay Plant** went into partial operation in April, and the plant is scheduled to go into complete treatment operation in April of this year.

The Long Island City intercepting sewer, a 5-mi-long tunnel, was about 98% complete at year's end. The adjoining intercepting sewer to the south has been completed.

Also on schedule and completed in 1956 was the **Borden Avenue Pumping Station** with its appurtenant intercepting sewers and force main.

Construction of sewage flow regulaters, tide gates and branch interceptors tributary to the tunnel was delayed, but now work is progressing satisfactorily.

Conner St. Pumping Station and force main tributary to the Hunts Point plant was 90% complete at the close of 1956. The $300,000 station is expected to go in operation within a few months.

Design for the second stage of the program have been advanced and construction will be started this spring. First item will be the **Morgan Avenue** intercepting sewer for the $80-million **Newtown Creek Pollution Control Project** to be located at Greenpoint Avenue in the Borough of Brooklyn. Bids are scheduled to be received in February for $3,600 ft of the 14,330-ft-long sewer, which will vary in size from 18 in. in diameter to an 8 ft-6 in. x 8 ft-6-in. section.

Designs are more than 80% complete for the $10-million **Kent Avenue** intercepting sewer of the **Newtown Creek** project. Contract may be delayed because of capital budget limitations, in which case a contract will be awarded for the $5.5-million deep-rock force main tunnel to carry Manhattan sewage under the East River to the treatment plant in Brooklyn.

Construction of an additional sludge vessel of the Owls Head class is also expected to start in 1957.

Bids will be received this spring for the $2.5-million, 90-in.-dia, 9,275-ft-long outfall sewer for the extension of the **Coney Island Pollution Control Project.** Outlet will be in Rockaway Inlet. Entire expansion of the plant is estimated to cost $9 million. Construction at the treatment proper will start in the fall of this year. This third stage extension to the Coney Island Plant will increase capacity from 70 mgd to 110 mgd.

In all, the second stage program will involve extension of 11 existing pollution control projects and 6 new ones—to cost upwards of $230 million. Ultimately, there will be treatment plants at 19 locations.

• **New York City (Water)**—During 1956,

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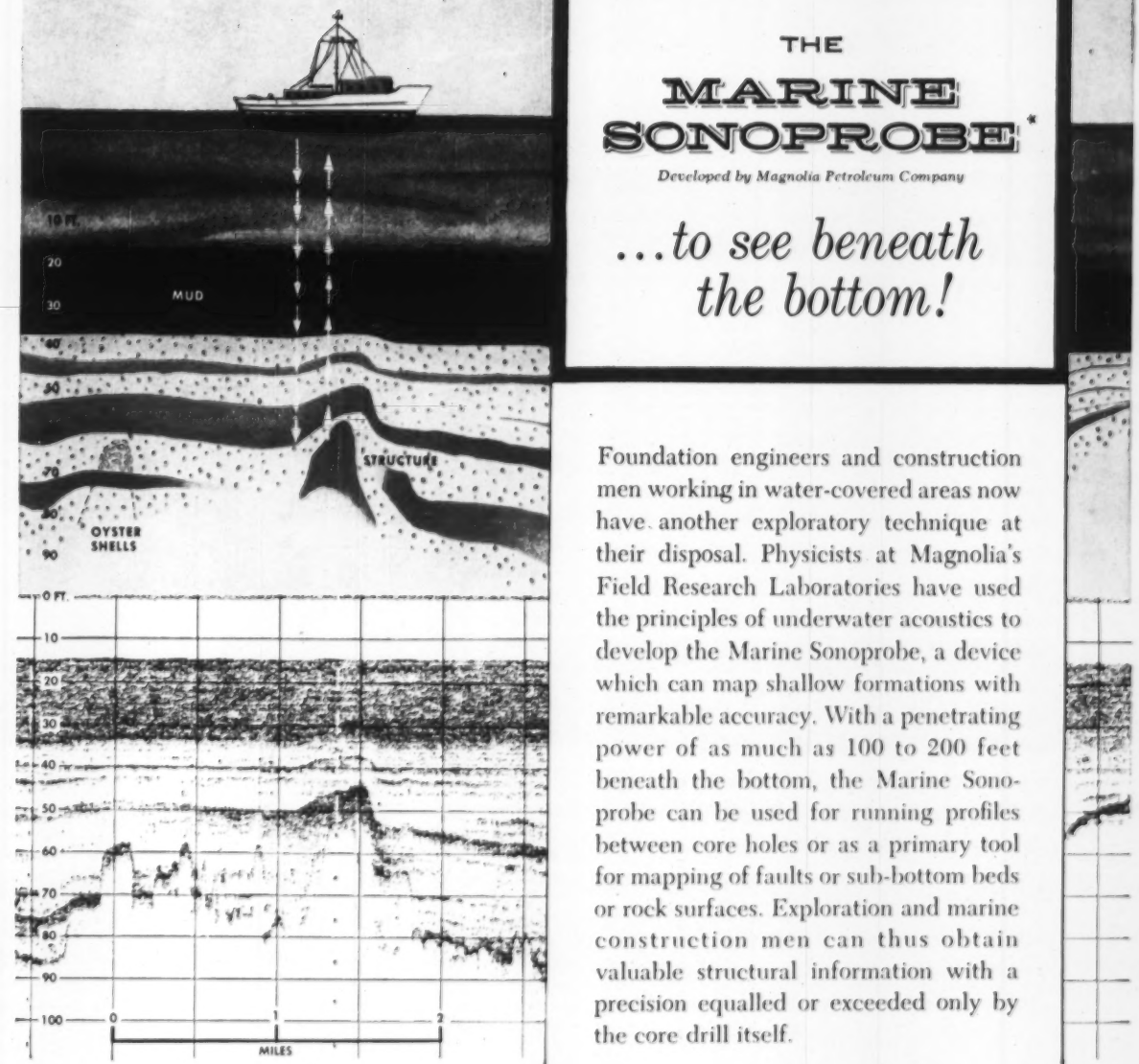

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the Board of Water Supply advanced design and construction of the **Cannonsville Project.** This is the third stage of the Delaware River Project, to get more water from the Delaware River for New York City. The Cannonsville project includes 91-billion-gallon Cannonsville Reservoir and the 44-mi West Delaware Tunnel. Work under two contracts totaling $36 million, awarded late in 1955 for the westerly 20 mi of the tunnel, was 15% completed at the end of 1956. A $12-million third contract was awarded in October and work begun on another 5 mi of the tunnel. Two contracts for the remaining 19 miles are scheduled to be advertised early this year. Work started in September at the site of Cannonsville Dam under a contract for access roads, bridges and appurtenant structures.

The hydro-electric plant at the outlet of the 25-mi East Delaware Tunnel connecting Pepacton and Rondout Reservoirs was put in operation in January of last year.

The first and second stages of the Delaware project are not virtually complete with equipment installed. A sewage treatment plant for the villages of Margaretville and Arkville at the upper end of the Pepacton Reservoir—included in the second stage of the project—is two-thirds complete. A contract for collecting sewers was awarded in December.

• **Philadelphia (Sewerage)**—The last major step in Philadelphia's $36.8-million, 10-year stream cleanup was completed in December. This was a new extension added to the old east bank interceptor sewer line to stop sewage pollution on the Central Schuylkill River. Until December, the old line poured in sewage at the rate of 26 mgd. The new extension carries the interceptor line to a new pumping station from whence 45 mgd of sewage are sent to the Southwest Sewage Treatment Plant. The extension project, which included a siphon under the river, the pumping station, two force mains and a gravity sewer line cost $8 million.

• **Philadelphia (Water)**—This city's changeover from slow sand to rapid sand filters in all its treatment works continued in high gear during 1956.

At the **Torresdale Plant** sedimentation tanks and foundations for the filters, chemical building and other plant structures were nearly complete at year's end. By 1959 the new 282-mgd rapid sand filtration plant (423 mgd at overload) should be finished at a cost of $22 million, and the existing 200-mgd slow sand filters abandoned for that purpose. To date, $14.5 million in contracts have been awarded, with $7.7 million let in 1956. The 1956 contracts included $4.4 million for filter equipment and piping, and $1.7 million for the plant building.

At **Queen Lane,** work began on converting (in-place) 20 slow sand filters to the rapid type. About 25% of the units are being converted at one time while the others remain in service.

Modernization at this plant also included new chemical and sedimentation facilities in virgin ground directly adjacent to the old plant. These are now in operation. The entire Queen Lane program will run to $10 million and is scheduled for completion in 1958. Existing 100-mgd capacity will be increased to 120 mgd (and 180 mgd at overload).

A third plant, **Belmont,** will be converted from slow to rapid sand beginning in 1958, and its capacity will be raised from 70 to 85 mgd.

• **Pittsburgh (Sewerage)**—Last year's biggest single sewerage project was the $100-million interceptor and treatment plant project of the Allegheny County Sanitary Authority—Pittsburgh and its environs. As a sewer job this is a major tunneling project, with 33 mi of tunnel in a total of 67 mi of interceptors. And as a sewage treatment job this is a major project on two counts: First, Pittsburgh is at the head of the Ohio River, where abatement of its pollution will mean significant cleanup of an important interstate stream. Second, the 150-mgd primary treatment plant now under construction will make major use of a new sludge-handling method—concentration by flotation followed by incineration, no digestion. It is the process devised by John Laboon, chief engineer of the Allegheny County authority. With completion planned for 1958, the overall project was 17% completed at the end of 1956.

• **Providence, R. I. (Sewerage)**—Rebuilding of the Fields Point sewage treatment plant was started toward the end of summer and is expected to take 2 years to complete. To cost $3.6 million, it is a key project in the cleanup of Narragansett's Bay pollution. Among other reconstruction, the plant will be expanded from an average of 45 mgd to 64 mgd and a peak of 164 mgd.

The Blackstone Valley Sewer District Commission's $10-million cleanup project of the lower Blackstone River went into operation Jan. 18. The last major link in the trunk sewer project was completed and the flow of untreated sewage into the river was halted. With completion of this last phase, the district commission is now treating 20 mgd of sewage from all of Pawtucket and Central Falls and parts of East Providence, Cumberland and Lincoln.

• **San Diego, Calif. (Sewerage)**—San Diego voters have approved construction of a treatment plant and ocean outfall to replace the present overloaded plant that is polluting San Diego Bay. Cost is estimated at $25 million.

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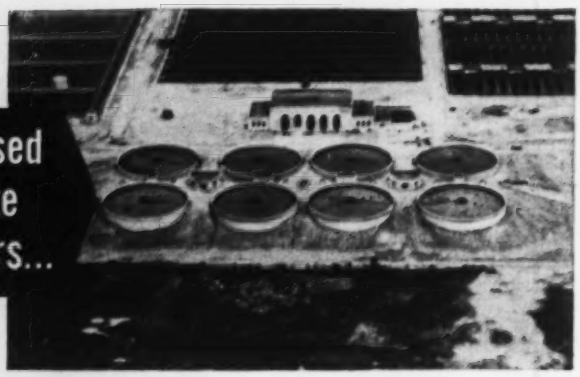

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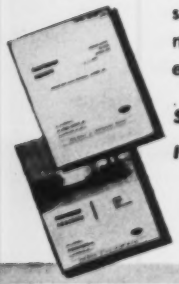

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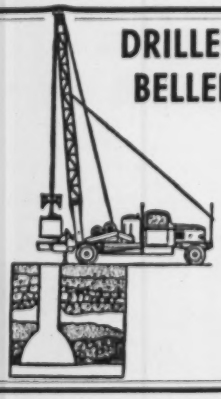

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Water Supply and Sanitation

• **Seattle (Sewerage)**—Work was substantially completed during 1956 on 50 mi of 8- to 36-in. sewers and a primary treatment plant for the **Southwest Suburban Sewer District** at a cost of $3 million. Additional work costing $2 million is proposed for the future, beginning in the fall of this year.

To the north of Seattle, the **Lake City Sewer District** has $6 million available for construction of sewers. Work is contingent upon enlargement of the Lake City treatment plant by the City of Seattle. Contracts for enlargement have been awarded, and the sewer district is expected to award contracts for $2 million of work in 1957.

• **Southern California (Water)**—The Metropolitan Water District of Southern California is continuing to expand its distribution system and is increasing capacity of the Colorado River Aqueduct. Construction expenditures for 1956 were $17 million and estimated cost for 1957 is $40 million.

At each of five aqueduct pumping plants a 4th and 5th pump unit and a second pump delivery line were completed and placed in operation in 1956; the 6th pump unit is to go in this year. Pumps, motors and other equipment for the 7th, 8th and 9th pump units are on order. Work will also start on the third delivery line. And when these last units are installed and the delivery line complete, plants will be up their full ultimate capacity.

Construction will be under way in 1957 on the second barrel of 12 mi of 13- and 13½-ft-dia aqueduct siphons. Completion will bring all aqueduct conduits east of San Jacinto tunnel to capacity.

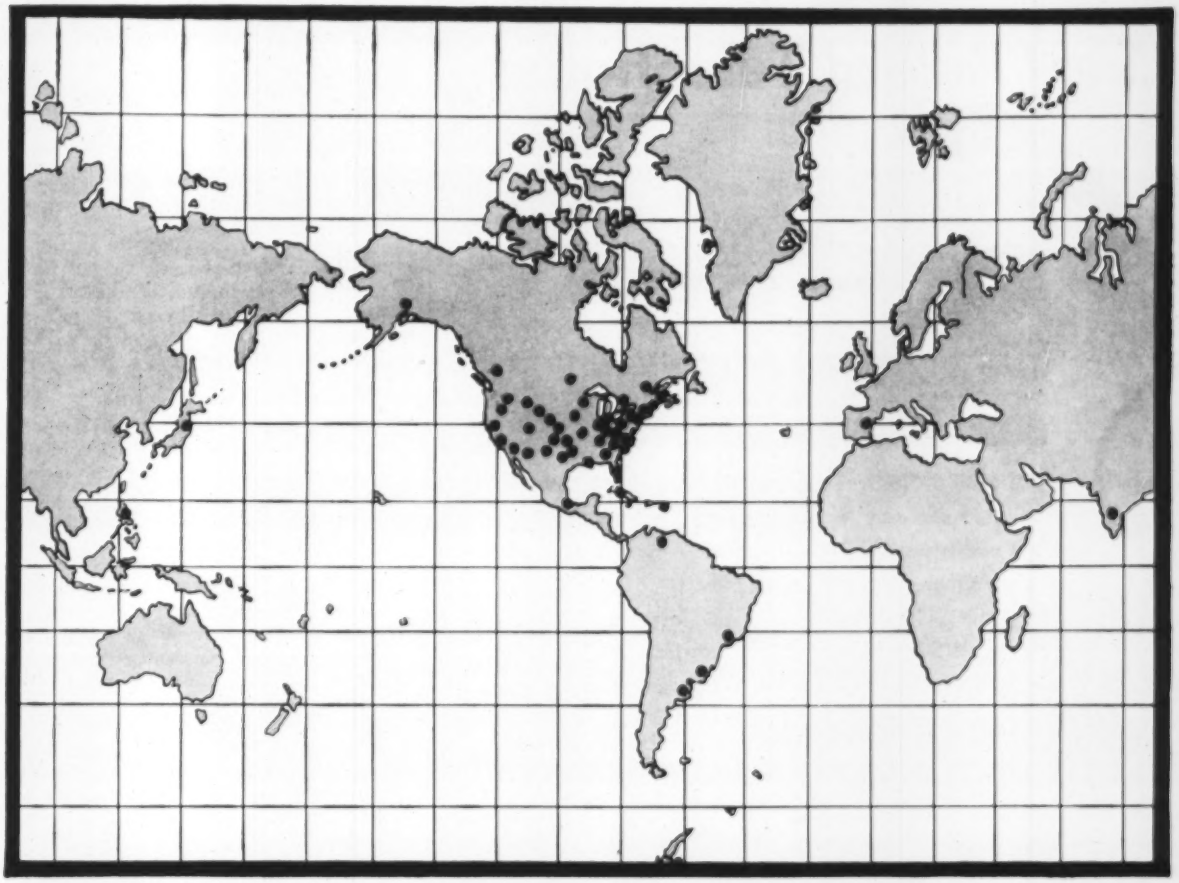
During last year, 24 mi of 48 to 108-in.-dia pipelines of the distribution system were completed on 6 contracts totaling $13 million. In 1957, 37 additional miles are scheduled to be completed under 6 contracts totaling $19 million.

The $15-million enlargement of Lake Mathews to more than double its present capacity, from 107,000 to 225,000 acre-ft, will be started in 1957

• **Spokane, Wash. (Sewerage)**—Spokane called bids early last month for construction of a $1.5-million disposal plant after more than two years' delay in final design and construction start by court action on behalf of citizens who objected to plant location. The state supreme court, late in 1956, approved the disposal plant location in northwest Spokane.

Interceptors for the $5 million sewage disposal system are about completed; three pumping plants remain to be built. Operation of the disposal system is expected to be possible in 1958.

• **St. Petersburg, Fla. (Sewerage)**—A $14-million program to sewer 54 sq mi and build three sewage treatment plants was 95% under contract at year's start and about 75% completed. The three plants, with an



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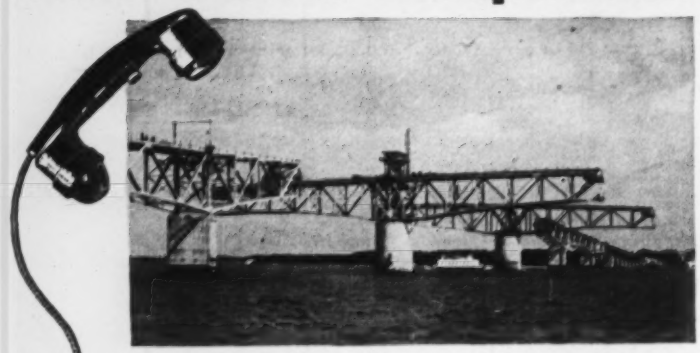

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ultimate capacity of 34 mgd, will supplement an existing plant of 12 mgd. Two of the plants are finished.

• **Toledo, Ohio (Water)**—A 40-mgd addition to Toledo's **Collins Park Filtration Plant** was completed in 1956. Cost was approximately $3¼ million.

• **Toledo, Ohio (Sewerage)**—The city plans to begin the last phase of its secondary sewage plant during 1957, to cost $3.6 million. Some of the initial phases of the project have been completed, and work is under way on a phase costing $4 million.

• **Washington, D. C. (Water)**—In the jurisdiction of the water supply division of the Washington District Engineer's office is the $4-million, 477-mgd, 15-vertical-pump **Dalecarlia Pumping Station** to supply four service-level areas within the District of Columbia, Arlington County and Falls Church, Va. During emergencies, it will also provide small amounts to Metropolitan Maryland. The pumping station is 72% complete to date and contract completion date is set for April of this year.

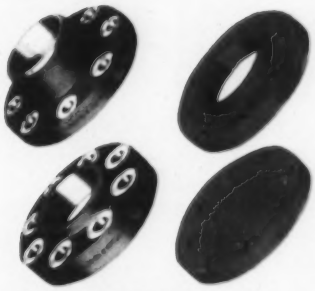
The **Little Falls Raw-Water Intake Works** is 50% done and completion date is the end of this year. The project, costing $4.5 million, includes a 1,500-ft-long concrete diversion dam across the Potomac River and a reinforced concrete pumping station.

Third High Reservoir North, located at Fort Reno, is 57% complete and expected to be finished in August. The reservoir will have a capacity of 20 million gallons. It will be of reinforced concrete of the flat slab rigid frame type, 380 ft long, 300 ft wide and 29 ft deep.

• **Wayne County, Mich., (Water)**—Bids on first work to draw water from the lower Detroit River are scheduled to be called in March. A tower intake in the middle of the river, a 4-mi transmission tunnel good for 450 mgd (ultimate requirement) and low-lift pumps, treatment plant and high-lift pumps of 150-mgd capacity—are expected to cost $35 million. Land acquisition, engineering and $10 million of distribution system will bring project cost to $50 million.

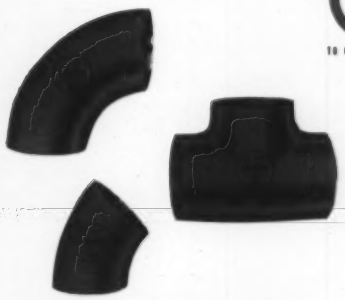
• **Yonkers, N. Y. (Sewerage)—The Westchester County Joint Treatment Plant** works has been designed for a 63-mgd capacity by the year 1980 with provision for expansion to 92 mgd by the year 2010. The $15-million project, located at Yonkers, will consist of a primary plant and a high-rate sludge digestion system, and is scheduled for completion by the end of 1958. The site is now being constructed on an area that was previously part of the Hudson River. A stone dike has been put in and fill is being placed. Bids for the plant proper will be taken around midyear.

BUTT WELDING FITTINGS
(IPS)

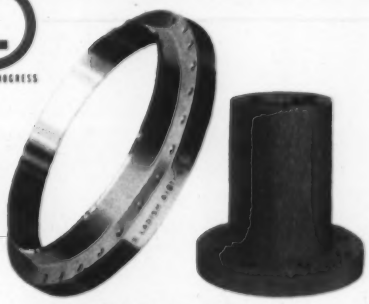


ASA and MSS FLANGES

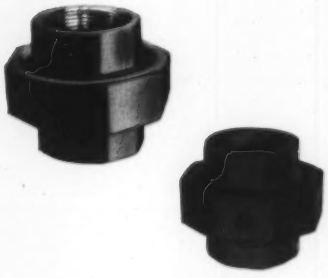
TO MARK PROGRESS



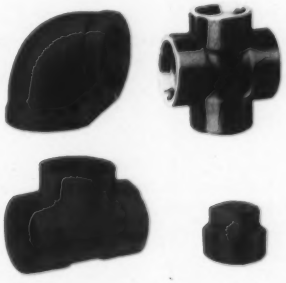
BUTT WELDING FITTINGS
(TUBE O.D.)



LARGE O.D., TEMA and
LONG WELDING NECK FLANGES



UNIONS



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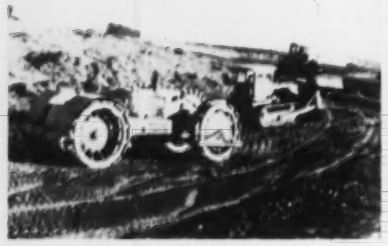
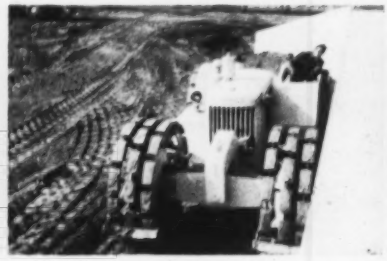
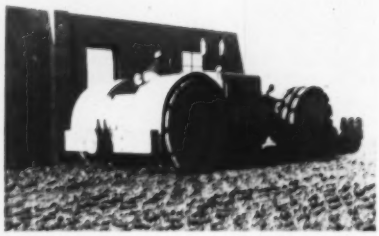
Use the BUFFALO-SPRINGFIELD K-45 KOMPACTOR



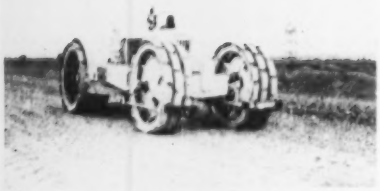
CLAY ON PLANT SITE—One of 3 KOMPACTORS compacting nearly 90 acres of clay with some sand and some muck pockets on a plant site near Novi, Michigan. The contractor said that the KOMPACTORS were the only machines that would do a satisfactory job of compacting the clay found on this particular job.



CLOSE TO CULVERTS—The K-45 eliminates hand tamping on culverts such as this. On this one contract, 6 concrete box culverts in 12,726 miles of highway made close compaction a necessity. The KOMPACTOR also averaged 1100 yds. an hour on banked material—due to faster speeds and more uniform compaction, replaced other equipment.

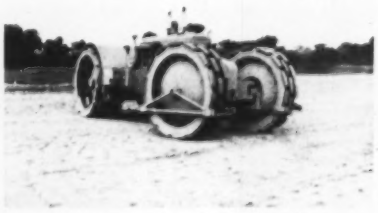


"AN INSIDE JOB"—What other piece of compaction equipment could go inside the building and work right up to the walls? This self-propelled, reversible, highly maneuverable K-45 KOMPACTOR is compacting the earthen sub-base over which the cement floor will be laid. No hand tamping required—time and labor costs greatly reduced.



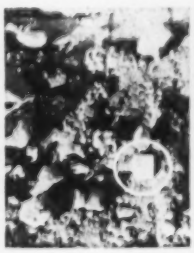
THIS K-45 worked at speeds of 5 to 6 mph compacting fill fast on a Texas airport construction job. There was no difficulty in meeting 100% density specification . . . only 2 to 4 passes by the big, self-propelled, 32,000 lb. K-45 were required. The contractor attained 500 to 600 cubic yards compaction per hour.

SAVES AN OPERATION—One entire operation, running coral rock through a crusher for base material, was saved by the K-45 on a Florida air base job. The self-propelled KOMPACTOR followed a tractor and a rooter to meet density specifications. Such highly efficient operation is another reason for the K-45's wide-spread popularity.



"TURNS ON A DIME!"—comparatively. Because the K-45 KOMPACTOR is self-propelled and operates at fast speeds of 5 to 6 miles an hour either forward or backward with equal ease, it is highly maneuverable. Its turning radius can't be matched even remotely by tractor-drawn compaction equipment. Saves time. All compaction is downward.

RECORD COMPACTION time in meeting density specifications on a $1,736,000 California highway construction job resulted from use of this KOMPACTOR. Just what quick results were obtained are shown graphically by the two unretouched photos of the soil (right). The first soil photo shows the material, before compaction, on the Ventura-Ojai, California road project. The second photo shows identically the same area after just 3 passes by the K-45 KOMPACTOR. (The pack of cigarettes in both photos is the same—see circles—and is shown for comparative size.) Fast speeds of 4 to 5 miles per hour by the self-propelled K-45 were maintained on this job.



● The K-45's "Interrupted Pressure Principle" of compaction does a better, more uniform job—provides minimum displacement of loose materials either forward or sideways—directs *all* compaction effort downward—requires *fewer* passes.

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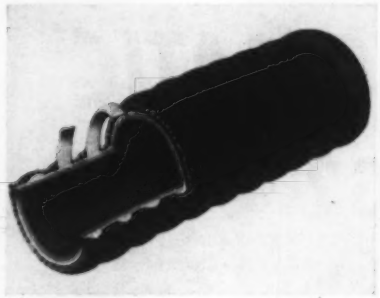

Crush-Proof Suction Hose Developed for Contractors

A new crush-proof, smooth bore suction hose has been introduced for use in the contractor field.

Springy Stycon synthetic rubber cord instead of wire is embedded in rubber between multiple plies of high-grade hose duck. This is said to give greater resilience to the hose, so it snaps back automatically if flattened by trucks, equipment or falling rocks.

Its corrugated construction permits greater bends without buckling, according to the manufacturer. And both tube and cover are made of thick rubber, compounded to resist the toughest abrasion encountered in contractor work.

Designated as Vitalic "368", the hose is available in 1¼, 2, 2½ and 3 in. size with lengths up to 50 ft. Continental Rubber Works, 2019 Liberty Street, Erie 6, Pa.

Wall Panels Have Core Of Corrugated Metal

Production of precut wall and roof sections made of hardboard or plywood and corrugated metal has been started by a New Orleans firm. The panels consist of two facing sheets separated by a corrugated metal core. The plywood or composition-board facing sheets serve as interior and exterior surfaces of a wall or roof.

Stock sizes are 2 and 4 ft in width and 8, 10 and 12 ft in length. Home and Building Parts Co., Inc., 515 Lafayette St., New Orleans, La.

Highway Earth Auger Does Heavy Duty

A new heavy-duty highway digger digs to the 48-in. required depth for setting post and guard rails, with augers available to 14 in. dia. It is easily mounted on tractors that are generally used for mowing brush and weeds along highways.

Standard equipment on the digger includes a slip-clutch Universal joint, ¾ in. spiral flighting with hardened long-wear edges, and a hardened "fish-tail" point for fast penetration. Roper Manufacturing Co., Zanesville, Ohio.

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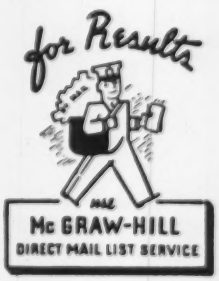

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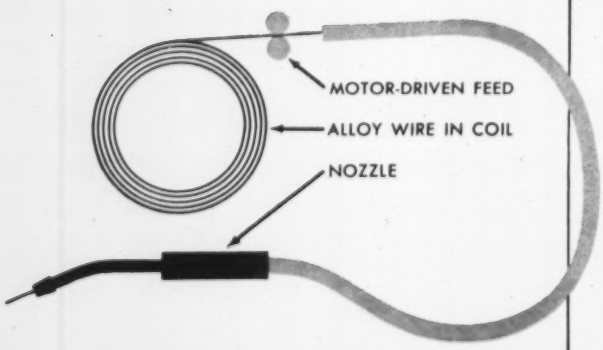
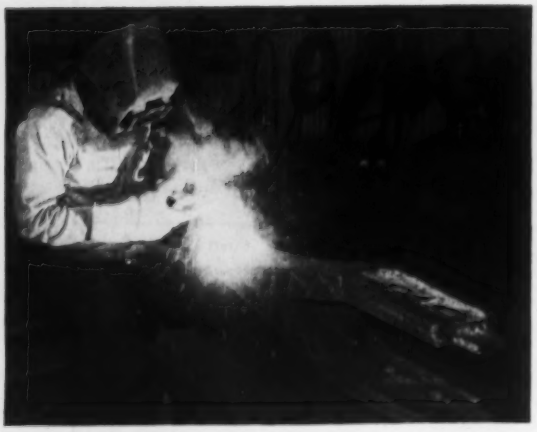
WHAT IS *SEMI-AUTOMATIC* HARD-FACING?

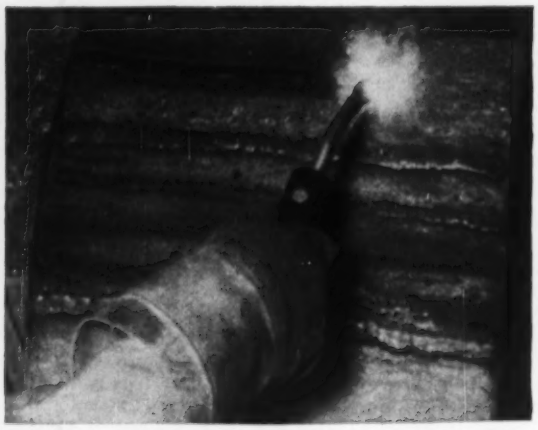
Here is one of industry's newest maintenance tools used to radically reduce hard-facing costs. It is simple, highly versatile and can be installed at moderate price.



Semi-automatic hard-facing is a process which combines the high deposit rates of automatic welding with the positioning and setup convenience of the manual method. It utilizes a complete series of Stoody fabricated tubular wires containing alloys that meet all hard-facing requirements. These wires, supplied in layer wound coils, are mechanically fed to the nozzle by the semi-automatic welding machine. The weldor merely directs the arc as the metal is deposited on the work, the machine automatically starting the wire feed when the arc is struck, stopping it when the arc is broken. Numerous advantages result when rebuilding and maintaining equipment in all types of heavy industry.



Repointer welded on with Stoody Nickel Manganese and entire tooth hard-faced with Stoody 121



Roll brought up to size with Stoody Nickel Manganese and corrugations rebuilt with Stoody 100

HIGH WELDING SPEEDS—Two to four times faster than the manual method at correct welding amperages, semi-automatic hard-facing effects enormous savings in time. Penetration of the base metal and dilution of the deposit are reduced, with lower heat input, all highly desirable features of this process.

FULL VISIBILITY—No submerging flux is required; the weldor enjoys complete visibility of the weld at all times. Flux dams are unnecessary.

NO STUB END LOSSES—Wires are supplied in continuous coils. There is no stub end waste nor time lost in changing electrodes.

SEMI-AUTOMATIC MACHINES—Now supplied by a number of manufacturers, all can be used satisfactorily with Stoody semi-automatic wires with minor conversions consisting of wire guides, nozzle and nozzle tip. Conversion kits are available from all Stoody distributors.

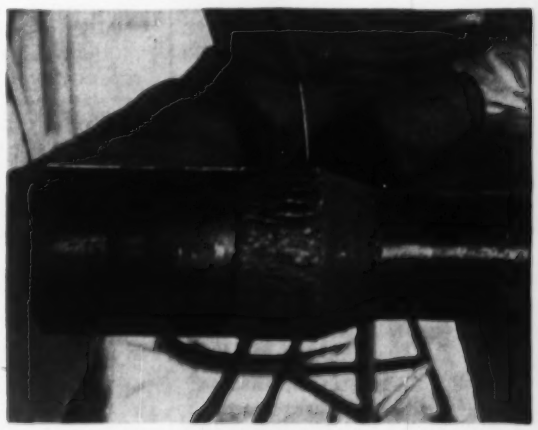
WHERE CAN SEMI-AUTOMATIC HARD-FACING BE ECONOMICALLY USED?—In general, almost any work now hard-faced manually can be completed faster and cheaper semi-automatically with deposits having wear resistance usually superior to manual electrodes of similar analysis. The illustrations are typical of current semi-automatic applications.

Write for circular. Contains a full description of present Stoody semi-automatic wires and typical applications.
Available from your Stoody dealer.
Check the "Yellow Pages" of your phone book or write direct.

Dredge pump casing hard-faced with a combination of Stoody 121 and Stoody 100

Shovel track pads rebuilt with Stoody Nickel Manganese

Mill hammers brought up to size with Stoody Nickel Manganese, using copper form, then hard-faced with Stoody 100



Tool joints hard-faced with Stoody 130 or Stoody 100

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New Drill Introduced For Masonry Materials

A high speed portable diamond drilling machine for concrete, brick, granite or any hard masonry material has been introduced on the market.

Equipped with a Molco water swivel, this unit will drill 2-in.-dia holes at up to 3 in. per minute. Holes as small as ⅞ in. can be drilled in the hardest of building materials, according to the manufacturer.

A flexible cable drive permits drilling in any position and eliminates the necessity of holding a heavy unit. It can be powered by plugging into any 110 volt circuit. POWDER TOOL FASTENERS, INC., CHICAGO, ILL.

Fast-Acting Ice Remover Effective at 30 below Zero

A new, fast-acting ice and snow remover in pellet form has been developed for factory driveways, roads, walks, parking lots, loading docks and steps, where fast and positive melting action is essential.

The remover, known as Tropical Ice Remover, is said to work faster than rock salt, flake calcium chloride or similar materials now available on the market. It is also said to be effective for melting ice at 30° below zero Fahrenheit.

Even when they are thrown on a steep grade, the pellets reportedly react instantly to penetrate the ice. And do not roll off the grade.

The ice remover works by exothermic reaction. The tiny pellets react chemically with the water in ice and snow to produce heat. And it is this heat that is responsible for melting the ice and the snow.

The remover, according to the manufacturer, can be safely applied to good concrete—particularly air entrained concrete that is used on most roads, sidewalks and driveways. The remover also will not damage asphalt surfaces. TROPICAL PAINT CO., CLEVELAND 2, OHIO.

New Crusher Is Introduced To Intermediate-Duty Group

The "Super Black Diamond", a new intermediate-duty crusher, has been introduced by McLanahan & Stone Corp.

The manufacturer says this fabricated steel unit provides, at moderate cost and weight, many of the features of heavy-duty crushers and is recommended for crushing such materials as shale, slate, gypsum, ores and mine refuse. It is produced with a 24-in. roll diameter in seven widths from 24 in. to 60 in.

A Steelstrut Toggle automatically protects the crusher from damage by uncrushable materials. A quick-adjustment device allows alterations for product size without stopping the crusher.

Construction features include cut steel gears, split bronze bearings, removable crushing plate and steel segment rolls. Bolt-on type segments of high carbon steels are standard. Hook-on rock-type segments also are available in high carbon or chrome-manganese steel. MCLANAHAN & STONE CORP., HOLLIDAYSBURG, PA.

Triple Bin Is Designed For Low-Cost Batching

Cimco Triple Bin, a new product for low-cost aggregate batching, has been introduced to the construction market.

The triple bin was designed to handle either two or three aggregates in batching, depending on specifications for the individual job.

It comes either mounted on wheels or unmounted. On the mounted model, wheels and axles can be removed, if necessary.

Economy is the keynote of the bin, according to the manufacturer. Cimco points out that with one low-cost loader, a triple bin and one conveyor, a contractor can keep truck mixers going. CIMCO, BOX 422, MARSHALLTOWN, IOWA.

It captured all eyes and "ayes" at the road show.....

COARSE STONE FINE STONE CEMENT SAND

New One-Man Operated BUTLER TX-4 BATCHING SYSTEM that Keeps Pace with FOUR 34-E Pavers!

PUSH BUTTON CONTROLLED

Pre-set batchers can be operated by single batcher man at cement platform, or by truck driver at each bin.

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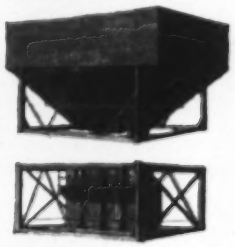

Bins are completely pre-assembled for easy crane handling, with hinged columns. Batcher units handled with all piping and wiring in place.

A new Concept in ULTRA HIGH SPEED BATCHING

If you were at the Show you saw it. Everyone did! New Butler engineered AUTOMATION so advanced, so flexible, so fast, so dependable that it *obsoletes* all existing roadbuilders' plants. It's the new BUTLER TX-4 Batching System, the modern batching plant that every contractor today *needs* to compete successfully. The contractor with only one paver starts with a TX-4 plant equipped with 2 batchers; then, as he expands with the road program, he simply adds additional batchers to the *same bins* to take care of 2, 3, or 4 pavers — and still retaining ONE-MAN OPERATION.

BUTLER BIN CO. 949 Blackstone Ave., Waukesha, Wisconsin

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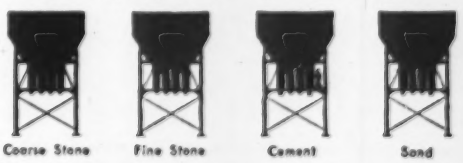
BASIC UNIT — Handles 1 or 2-batch trucks.

Coarse Stone Fine Stone | Cement | Sand

EXPANDED UNIT — Batchers added to handle 4-batch trucks, 4 pavers operating at maximum capacity.



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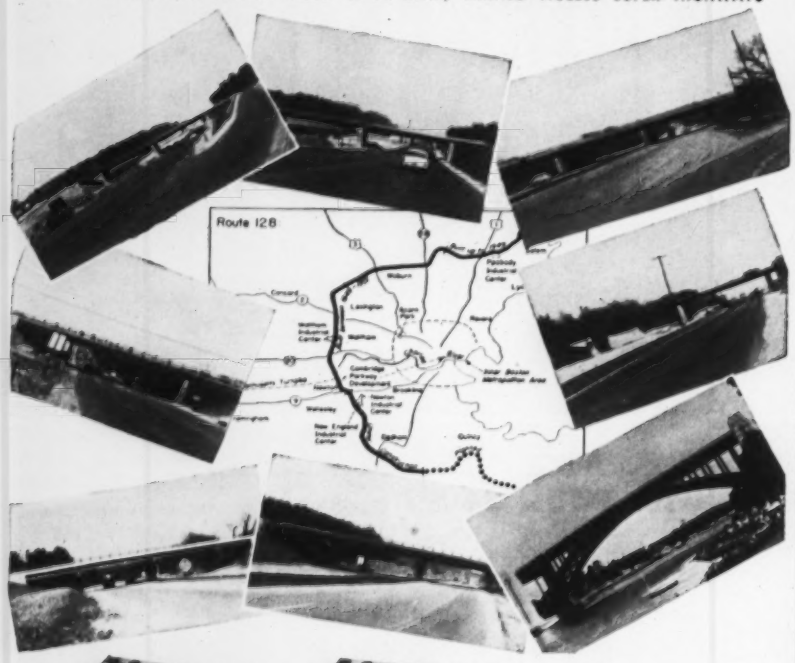
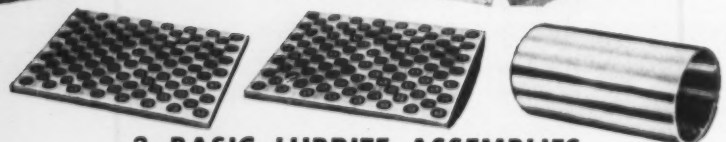
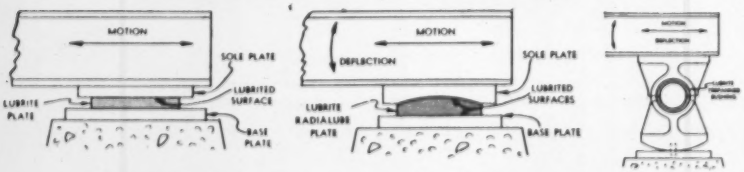




3 BASIC LUBRITE ASSEMBLIES



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. . . Publications

Compressor data—A revised reciprocating-compressor bulletin incorporates new condenser ratings resulting from design innovations in Trane 60, 75, and 100 ton condensers. Also included for the first time are ratings and data on the firm's 125 and 150 hp compressor and condensing units. BULLETIN DS-361, TRANE CO., LA CROSSE, WIS.

Concrete block machines—The German firm of Zenith-Apparatebau introduces its line of motorized and hand-powered concrete-block-making machines in a 4 page bulletin giving specifications, performance data and operating procedure for the various models. Also described is a motorized dump scooter used as a feed truck for the block machines. U.S. REPRESENTATIVE, MILTON M. LAEMLE, 23 OLD COLONY LANE, GREAT NECK, N. Y.

Metal lathing and furring—"Specifications for Metal Lathing and Furring," a 20 page bulletin, contains general specifications and detail drawings for numerous types of metal lath construction. Included are span-load tables and construction requirements for various fire-resistive ratings. METAL LATH MANUFACTURERS ASSOCIATION, ENGINEERS BLDG., CLEVELAND 14, OHIO.

Plywood forms—Symons Clamp and Manufacturing Co. has issued two catalogs describing the firm's two lines of plywood forms, Mag-ply (with magnesium frames) and Steel-ply (with steel frames). On-the-job photos of both types are contained in the catalogs along with information as to their advantages and assembling procedure. Various details of corner, pilaster and filler arrangements are included. SYMONS CLAMP & MFG. CO., 4249 DIVERSEY AVE., CHICAGO 39, ILL.

Building stone—Four brochures dealing with the use of stone in hospital, school, church and commercial building construction have been issued by the Building Stone Institute. The bulletins survey the use of stone in modern architecture and include split face applications as well as dimension and limestone. The brochures stress the economy of stone through its durability and freedom from maintenance. BUILDING STONE INSTITUTE, 1696 SUMMER ST., STAMFORD, CONN.

Special copper alloys—A tabulation of nonstandard, wrought copper base alloys has been prepared by the Copper & Brass Research Association. It is a compilation of special copper alloys not

"C's" were push-loaded in wet sand by Tournatractors or Crawlers, either singly or in tandem, depending on conditions. 'Pulls moved an average of 11 cu. yds. per trip.

Blythe Bros./Morrison-Knudsen use 8 Tournapulls, 2 Tournatractors

to speed completion of major air base

At Belle Chasse, La., about 7 miles southeast of New Orleans, a joint venture of Blythe Brothers and Morrison-Knudsen of Charlotte, N.C. and Boise, Ida. is completing the second of two runways for Alvin Callender Joint Air Reserve Training Center. This latest runway will be 6,000′ long — with 1,000′ of overrun at each end, and 8,000′ of connecting taxiways.

10 LeT-W units on the job

The contracting team started work on the 1,000,000-cu. yd. project with a large equipment fleet which included 2 LeTourneau-Westinghouse Tournatractors. Several months later, the combine brought in 4 C Tournapulls of their own to replace other earthmoving equipment operated by a subcontractor.

The "C's" did a good job — so good a job, in fact, that the contractors purchased 4 more new "C's" a year later to speed completion of the job!

Push-loading scrapers on this job are 2 Tournatractors and 2 crawlers. Rubber-tired pushers are used mainly for loading over long stretches of tough-loading, hard-packed sand. Crawlers push-load in deep, loose sand, where scrapers can pick up a full load in a short distance. Both types of pushers are used singly or in tandem — depending on materials and loading difficulty.

Haul 11-yd. loads over mile cycle

"C's" load and haul an average of 11 pay yds. per trip on a 1 mi. cycle. Loading distance averages 100′, haul 2,525′, and spread 50′. A total of 550,000 yds. has to be moved in construction of the second runway.

"Tournapulls best for job"

Foreman E. E. Pigg has this to say about C Tournapulls: "There is no other piece of equipment that would give us the service and production these 'C's' are giving. If there was, you'd probably see others out here. But it's all a 'C' job. They give us everything we ask for."

Ask about Fullpak

The LeTourneau-Westinghouse C Tournapull can do a profit-making job for you, too. Now available is an improved "C" scraper — the "Fullpak" — with a capacity of 18 cu. yds. heaped. Fullpak loads faster, boils better, heaps a bigger load. Ask us to show you how it will cut costs and shorten work time on *your* next earthmoving contract!

Tournapull swings around on edge of fill, building up low area which has been cleared of muck by draglines.

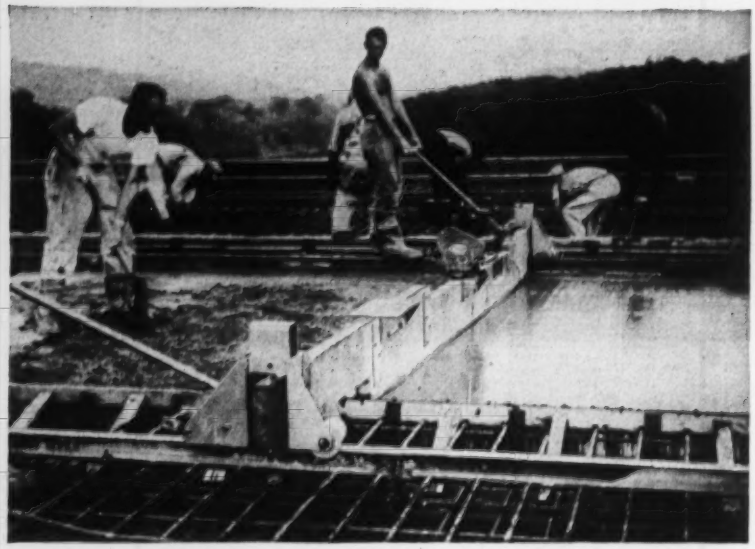
Fullpak—Trademark, Tournapull—Trademark Reg. U.S. Pat. Off. CPCT-1058-A-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

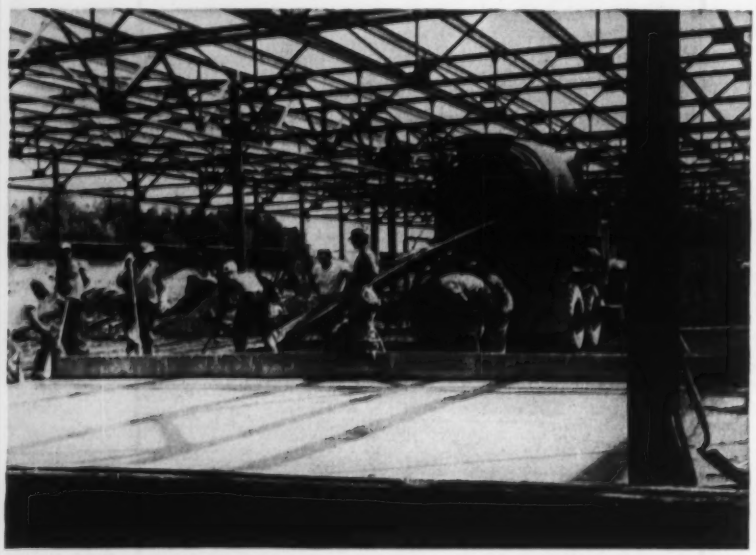
A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

STOW SCREEDS CUT BRIDGE DECK PRODUCTION TIME IN HALF



Here's the story. The Brunalli Construction Co. had the contract to finish the bridge decks on the Massachusetts Turnpike. They used a Stow 14 ft. vibrating screed, and a 20 ft. screed on the job, employing a special underslung beam so that the "I" beam rails could be located above the surface of the concrete. Because Stow Screeds can strike off *stiff* concrete smooth and true to grade, experience has proved that they cut production time almost in half . . . even on bridge decks!

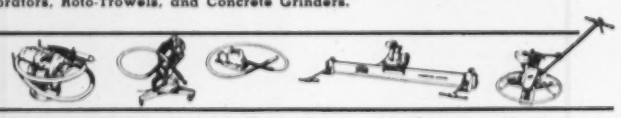


Screeding Floor of new IBM Plant.

Here a 25'5" Stow Vibrating Screed strikes off a floor in the new $12,000,000 IBM plant in Owego, N. Y. The entire plant was laid out in lanes of equal width so that the same screed beam could be used throughout. This power unit on this screed can be bought as a package to be mounted on your own beam.

For more information on this equipment, contact your Stow Distributor (listed under "Concrete Vibrators" in the yellow pages of the telephone directory of most cities) or write for Stow Catalog 560—and complete information on Stow Vibrating Screeds, Vibrators, Roto-Trowels, and Concrete Grinders.

STOW



STOW MANUFACTURING CO., 19 Shear Street, Binghamton, N. Y.

listed in the association's manual of standards. The list provides the trade name, generic name, nominal composition, forms available, typical applications and mill source for each alloy. COPPER & BRASS RESEARCH ASSOCIATION, 420 LEXINGTON AVE., NEW YORK 17, N. Y.

Moisture problems—A manual entitled "Design Techniques for Controlling Moisture in Building Structures" has been prepared by W. R. Meadows, Inc. The booklet discusses moisture movement, condensation problems, effects of improper construction and methods of controlling moisture and vapor movement. The text includes many illustrations outlining good design and construction practices. W. R. MEADOWS, INC., 7 KIMBALL ST., ELGIN, ILL.

Bridging tests—In a new technical bulletin the Steel Joist Institute reports how various types of bridging affect the behavior of open-web steel joists, short-span series. The 15 page illustrated booklet describes an extensive test program, indicating that continuous horizontal bridging is the most satisfactory type. STEEL JOIST INSTITUTE, DUPONT CIRCLE BLDG., 1346 CONNECTICUT AVE., N.W., WASHINGTON 6, D. C.

Curtain walls—A data file on Bayley aluminum windows and curtain wall systems comprises a file folder and several publications. Two bulletins list window and curtain-wall types, together with accessories. Several instruction sheets outline installation details of the units; and a number of photographic sheets emphasize construction features. WILLIAM BAYLEY CO., 1200 WARDER ST., SPRINGFIELD 99, OHIO.

Cooling towers—General features, recommended specifications, typical installations and accessories of Pritchard cooling towers are outlined in a 16 page catalog. Tower dimensions and general arrangement, and foundation and supporting-steel requirements for single and multiple cells are given in detailed layouts. Refrigeration capacities are tabulated for various models in the "B" and "R" tower series. J. F. PRITCHARD & CO., 4625 ROANOKE PARKWAY, KANSAS CITY 12, MO.

Air-mixing units—Air-mixing and distributing units for use in dual-duct air-conditioning systems are described by text, photos and diagrams in a 4-page pamphlet, Bulletin DD-3. BUENSOD-STACEY, INC., 45 W. 18TH ST., NEW YORK 11, N. Y.

Sliding glass doors—Arcadia Metal

On Route 4, north of Sleepy Eye, Minn., Berghuis Construction Co.'s Adams 550 grades fill in 3rd gear (4.5 mph).

When traffic over a narrow, hump-backed 17-mi. section of Minnesota State Route 4 — from Fairfax to Sleepy Eye, Minn. — grew too heavy for safety, the State Highway Dept. decided to rebuild it. Berghuis Construction Co., Prinsburg, was awarded the earthmoving contract. The roadway was to be widened, ditched, and regraded to make driving safer, and to permit heavy commercial traffic.

Berghuis split the 465,000-cu. yd. dirtmoving job between two work groups. Three crawler-drawn 19-yd. LeTourneau-Westinghouse 8T scrapers worked ahead, cut down high shoulders and cleaned drainage ditches. Then two 23-yd. 8 Tournapulls and three 16-yd. "C's", push-loaded by 2 crawlers, hauled sandy-clay fill to build new grade. (Current models have 25 and 18-yd. capacities.) Tractor-pulled LeTourneau-Westinghouse 120 and W-2 sheepsfoot rollers compacted the fill. Three motor-graders handled the grading (50% was done by an Adams 550). A rubber-tired Tournatractor and a crawler were assigned miscellaneous dozing, casting, and finishing jobs. Work was completed in the scheduled 120 working days.

Mobility and speed of heavy-duty grader boosts Berghuis fleet production

Berghuis Construction Co., Prinsburg, Minnesota, helps speed dirtmoving, and keep all units of its production "team" working at top capacity with a versatile Adams 550 motor grader. On a 17-mile highway contract—improving Minnesota Route 4—Berghuis used "550's" 8th-gear-speed of 25 mph to move the machine quickly from one job to another... whenever and wherever needed. This Adams grader spread fill behind self-propelled scrapers, leveled the new road surface, formed shoulders, and cut ditches and bankslopes. It kept 600′ to 800′ haul-roads smooth for Tournapull scrapers traveling at 16 mph on 3 minute cycles.

Owner Delwin J. Berghuis, happy with the performance of his "550" . . . says, "I like the speed and maneuverability of the Adams, and feel that it has done a great job for us. On the Route 4 project it helped put us ahead of schedule."

8 forward, 3 creeper, 4 reverse speeds get more work done, faster, at lower cost

On the Adams 550, constant-mesh transmission provides a range of 8 standard speeds forward, from 1.4 to 25.2 mph. With 4 standard working speeds under 6.5 mph, you blade, ditch, mix, and bank cut at time-saving production speeds. Lighter work, including off-season contract snow-plowing, is done in 5th and 6th. The two top gears — with speeds to 16.1 and 25.2 mph — cut travel time between chores, speed grader job-to-job.

Three optional creeper gears — 0.25 to 1.76 mph — afford very slow speeds for fine-grading and close-quarter maneuvers. They give you smooth control and extra power to rip hard-packed roads and old asphalt. Creepers also reduce heavy shock loads in working through rocks and roots, eliminate "slipping the clutch".

Four reverse gears offer speeds to 13.2 mph for reverse blading and ditching as well as fast back-up. With this wide range of reverse gears you get more work done and reduce non-productive shuttle time.

Call or write for a demonstration. See for yourself how Adams graders handle heavy work easier, faster than any grader you've ever used!

New POWER-Flow 660...190 hp with torque converter...30,200 lbs.
Model 660...150 hp...30,050 lbs.
Model 550...123 hp...26,370 lbs.
Model 440...104 hp...24,080 lbs.
Model 330... 80 hp...23,020 lbs.
Model 220... 60 hp...15,500 lbs.
(Weights shown are usual working weights)

TraveLoader — Self-propelled, belt-type loader for picking up and loading into trucks from windrows and stockpiles. Choice of 55 hp gasoline or 60 hp diesel engine; 16,800 lbs.

Adams, POWER-Flow—Trademark, Tournapull, Tournatractor—Trademark Reg. U.S. Pat. Off. AG-31-H-b

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3 models, 150 to 1875 amperes

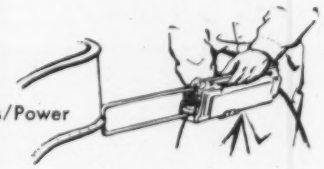
D-C Selenium Rectifier Type
12 models, 3 to 1500 amperes

D-C Selenium Rectifier Constant Potential Type
3 models, 300 to 1000 amperes

A-C/D-C Combinations for Metallic Arc Welding
6 models, 10 to 525 amperes

Spotwelders
14 models, 1.5 to 20 KVA

A-C and D-C Engine Driven Welders/Power Plants
6 models, 15 to 350 amperes



A-C/D-C Combinations for Inert Gas/Metallic Arc Welding
8 models, 10 to 550 amperes

A-C Inert Gas Welders
23 models, 5 to 700 amperes

High Frequency Units
9 models, up to 1000 ampere capacity

High Frequency Units with Water/Gas Controls
8 models, up to 1000 ampere capacity

PLUS: control panels, remote control units, water coolant systems, electrodes, electrode holders, running gear and welding accessories.

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Dur-O-wal Div., Cedar Rapids Block Co., CEDAR RAPIDS, IA. Dur-O-wal Prod., Inc., Box 628, SYRACUSE, N.Y. Dur-O-wal of Ill., 119 N. River St., AURORA, ILL. Dur-O-wal Prod. of Ala., Inc., Box 5446, BIRMINGHAM, ALA. Dur-O-wal Prod., Inc., 4500 E. Lombard St., BALTIMORE, MD. Dur-O-wal Div., Frontier Mfg. Co., Box 49, PHOENIX, ARIZ. Dur-O-wal, Inc., 165 Utah St., TOLEDO, OHIO

. . . New Products

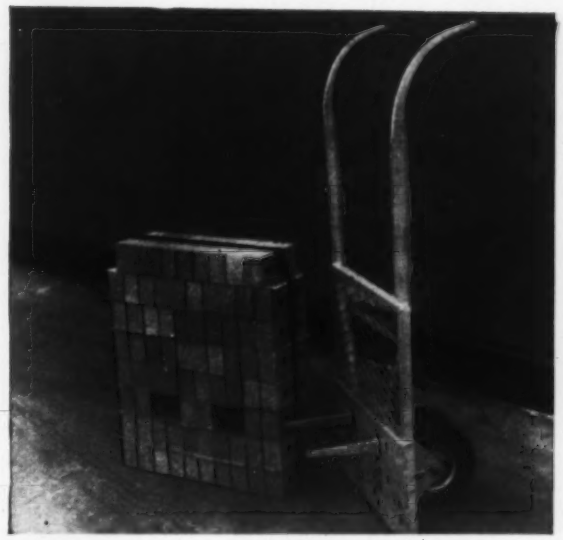
Products' 1957 catalog lists the company's line of aluminum and steel-framed sliding glass doors. Charts give rough-opening sizes, glass dimensions and shipping weights for standard and heavy-duty aluminum and standard steel stock doors. Close-up photos show details of the head and jamb sections, sill interlockers and hardware designs. Also listed are special custom types of sliding doors. ARCADIA METAL PRODUCTS, FULLERTON, CALIF.

Steel painting—The Lead Industries Association has issued an 8 page pamphlet dealing with the surface preparation of steel for the application of primer paints. The pamphlet, "Red Lead Technical Letter No. 11," is intended to help the industrial user get the longest possible service out of his paint. It contains a reference table indicating the recommended surface preparation methods and primer types for specific types of steel structures, and exposure conditions. Drying times are also given. LEAD INDUSTRIES ASSOCIATION, 60 E. 42ND ST., NEW YORK 17, N. Y.

Wood adhesives—A bulletin reviewing durability tests on woodworking adhesives has been issued by the Borden Co. The reported results were obtained in tests on plywood aged 10 to 16 years under various exposure conditions. Entitled "Durability of Woodworking Adhesives," the bulletin also gives comparisons of a number of adhesives used on different veneer species under continuous outdoor exposure for a period of from 5 to 10 years. CHEMICAL DIVISION, BORDEN CO., 350 MADISON AVE., NEW YORK 17, N. Y.

Hot-water heating—This 22 page bulletin contains design information required for the application of Herman Nelson classroom unit ventilators and matching convectors to forced-hot-water systems. The publication supplements two earlier bulletins, Engineering Data AIII and Capacity Tables CIII for classroom unit ventilators. Bull. 600-E1A. AMERICAN AIR FILTER CO., 215 CENTRAL ST., LOUISVILLE, KY.

Bidding procedure is discussed in a 13 page booklet prepared by the Canadian Construction Association. Entitled, "A Suggested Guide to Bidding Procedure," the publication contains recommended practices for competitive lumpsum bidding on construction projects. It also has special sections on preliminary investigations, drawings, specifications, sub-contracts and separate contracts. CANADIAN CONSTRUCTION ASSN., 151 O'CONNOR ST., OTTAWA 4, ONT.



New 75-brick multi-pack, designed for use with Flink hand fork truck. Effectively used by small home builders.

100-brick packs can be handled 3 at a time by fork truck or one at a time with manual equipment.

232-brick twin pallet multi-pack by West Brick Buggy Co. Pack can be split on the job as shown.

380-brick pack. Economical way to handle a large volume of brick from kiln to contractor.

Four good ways to cut brick handling costs

Shown above are four examples of modern brick packs that help make brick cost less from kiln to finished wall. They save brick and time, too. The brick are easily unitized by manufacturer, dealer or contractor using Signode tools and steel strapping. Pack size and stacking patterns may be varied to meet the requirements of contractor's handling equipment. Signode, pioneer and developer of many successful multi-pack methods, has the strapping tools, strapping and specific experience that can help you take advantage of the savings unitizing offers. Let a Signode man show you. No obligation. Write:

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A UNIT of the Alweg system is shown on concrete and steel rail as it will look when it is installed in Sao Paulo.

Politics Halt Sao Paulo Monorail

A revolutionary new monorail train system that had been announced as the type to be used in Sao Paulo's "Metro" system has caused a minor political revolution. Pending outcome of the uproar, all plans are held up.

Last October, the CMTC (Sao Paulo Transit Co.) announced that it would receive bids from companies interested in building a rapid transit system, the first leg of which would run through the heart of the city.

Early this month, in a special interview to Brazilian newspapers, Alweg Forschung G.m.b.H. (Society of Research and Studies) of Cologne, Germany, announced that it had "won" in the "competition." The other two competing companies were said to have been the Societe Generale Tractions et Exploitations (French) and Pacific Consultants KK (Japanese).

The chief of the Japanese group, Yasuo Kawamo, protested and called for a re-examination by the judging committee on the grounds that the Alweg system was misrepresented.

Members of the city council had previously condemned the bid competition as a "shadow competition", hinting that the whole thing was unfair from the start.

The Japanese group contends that the Alweg (Axel Wenner Gren) system raises serious doubts because of the following reasons:

- It has not yet been technically proved or perfected.
- It has a low carrying capacity per train because it was designed primarily as an inter-city hauler, not an intra-city carrier.
- It will oblige the riders to pay a "fabulous" sum per ride.
- The equipment cannot be made locally in Brazil.

The "coordinator" for Alweg in Brazil, Carlos Henrique Schneider, de-

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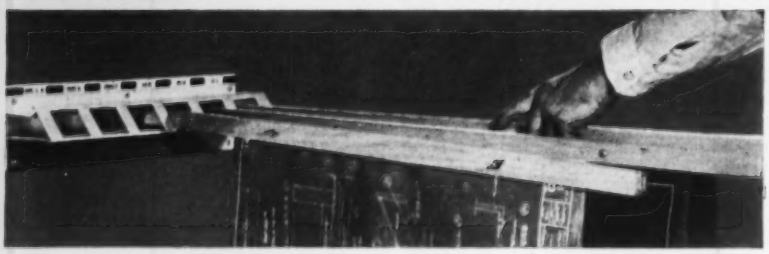

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fended his company's position by pointing out that research that went into the monorail train cost at least $6 million, which the city of Sao Paulo will get for a minimum price.

The price will be a tax of 12% to cover construction costs and cost of operating the system for one year, plus 10 centavos "royalties" to be paid by each passenger (included in the ticket price).

Alweg is said to be prepared to give the CMTC an unusual guaranty to "demonstrate the excellence of the system." The company plans to construct, as a showpiece, three kilometers of an elevated two-way track with three stations and all the necessary controls for two demonstration cars. The CMTC will pay for this, but, if not satisfactory, Alweg will reimburse the agency for the costs.

If approved, the trains will run on an overhead reinforced concrete track, with the cars resting on a single concrete rail 80 cm thick, 1.4 m high. The columns will be approximately six meters high, spaced 15 m apart. The system can be run as an elevated on the surface or in tunnels.

The cars will have air-conditioning, large doors and will be able to carry from 50,000 to 100,000 passengers per hour in each direction. The trains can run on a 90 second headway to eliminate waiting lines of passengers. Car wheels are to be capped with tires.

Underwater Pipeline Links Italy to Ischia Island

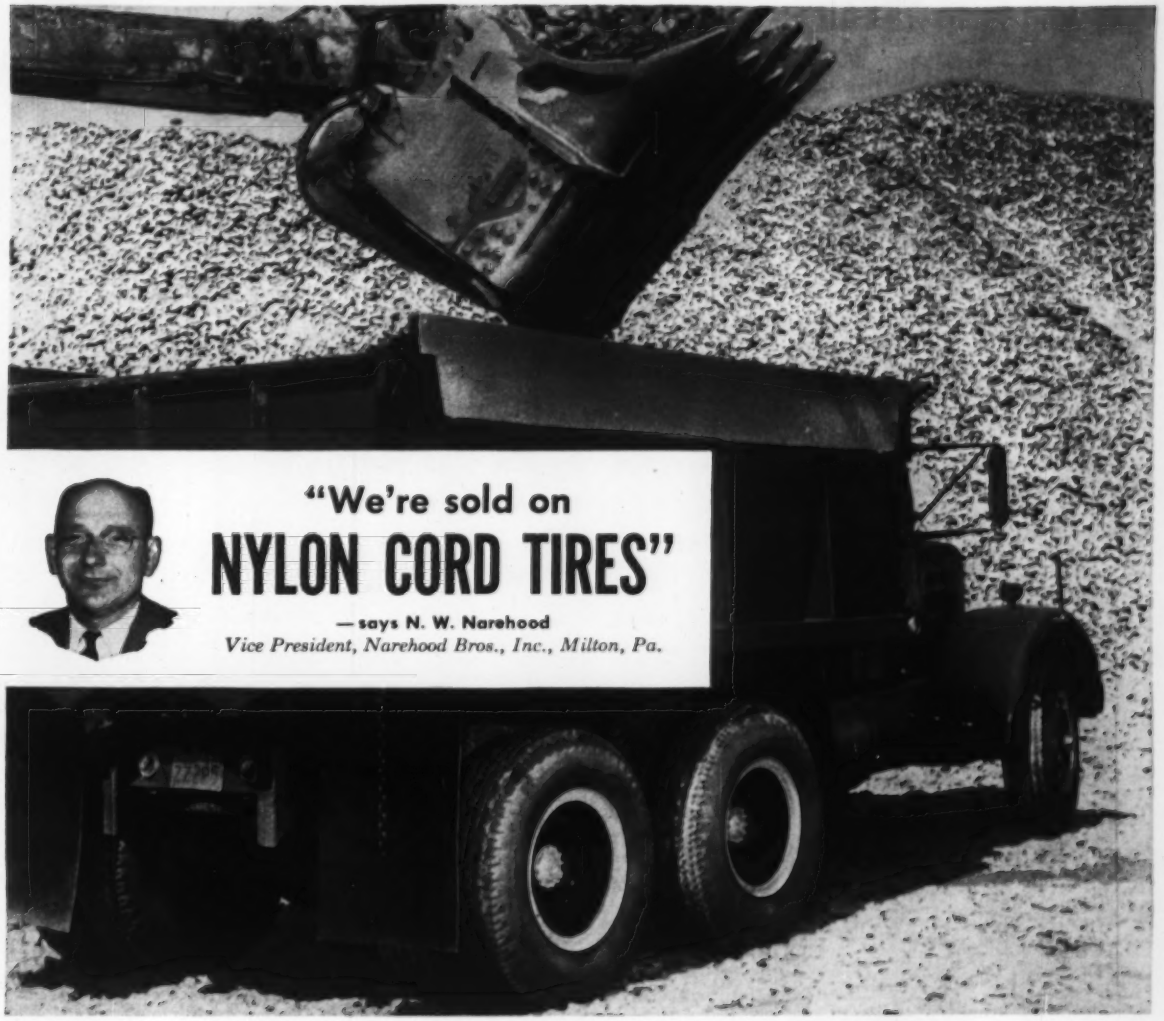
The first $1.5 million section of a 20,000-ft-long, 11.8-in.-dia pipeline from the mainland of Italy to the island of Ischia (off Naples) will start carrying water this summer at the rate of 26 cps.

An 11,000-ft-long, bituminous-covered steel pipe is going in now from Miliscola on the mainland to the intermediate island of Procida. From there a 9,000-ft-long section will run to Ischia. A 2-ft-deep trench has been dredged on the sea floor for the first link, whose maximum depth reaches 51 ft. From Procida to Ischia, the maximum depth goes down to 89 ft.

The pipe to be laid is set on a series of metal slides and pulled along the sandy bottom of the trench by steel cable from winches at Procida and Ischia.

It was decided to lay the pipeline in trench when it was found that little crustacea, "dente di cane," perforated the bituminous casing and exposed the steel pipe if it were simply laid on the ocean floor.

(*International continued on page 234*)



"We're sold on NYLON CORD TIRES"

—says N. W. Narehood
Vice President, Narehood Bros., Inc., Milton, Pa.

"We get longer wear, more retreads, fewer failures with nylon cord tires"

"Our road delays due to tire failures are down 90%. We used to have plenty of blowouts, particularly in hot weather. Now they're a rare thing!

"Six days a week, 12 hours a day, we move our 20-truck fleet over a 150-mile radius from the quarry to road-construction sites. The trucks roll over piles of blasted rock with 16-ton loads, yet some of our nylon cord tires have seen over 125,000 miles' service. We've found nylon cord tires have the extra strength to take day-in, day-out punishment and still give us good service after three retreads. You can see why our tire costs are down and why we've authorized total replacement with nylon cord tires for our fleet!"

PROVE TO YOURSELF that nylon cord truck tires give more mileage, more retreads, at the lowest cost per mile. Ask your dealer about nylon cord truck tires today. (Du Pont makes the tough nylon yarns, does not produce tires.)

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FOR TRUCKS AND PASSENGER CARS, TOO . . .
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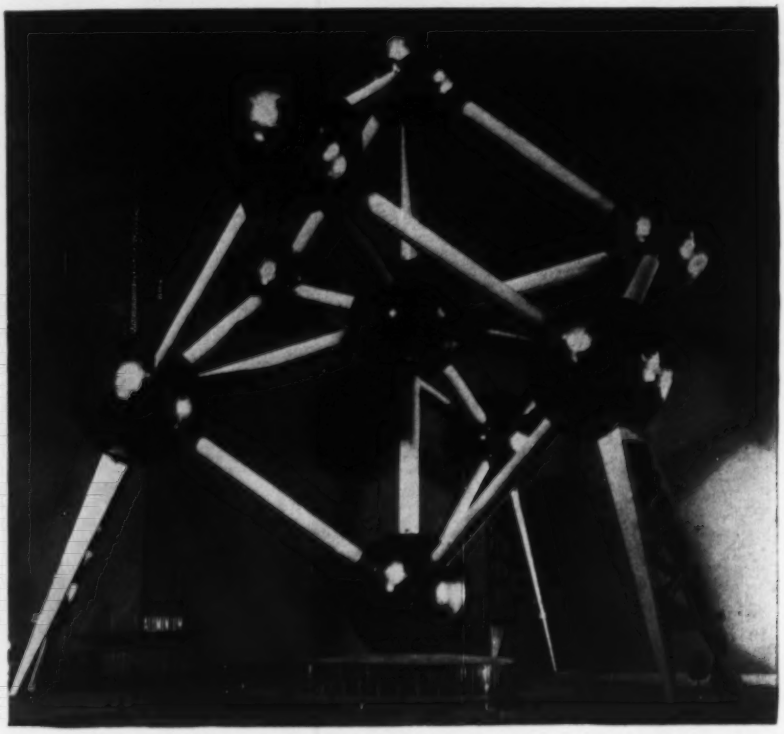

Belgium Building Theme of 1958 Fair

An unusual structure is beginning to rise in a Brussel's suburb. Called the "Atomium" and reflecting the "peaceful use of the atom" theme of the 1958 Brussels World Fair, the structure will be a gigantic model of the elementary crystal of iron.

The Atomium, symbol and dominant structure of the fair, will reach a height of 360 ft. The nine atoms of the cubical iron crystal will be represented by 59-ft-dia spheres, eight at the vertex and one at the center of the cube. They will be interconnected and supported by tubular passages. The distance between the spheres, measured along the cube's edge, will be 95 ft. The building, if it can be called that, will remind the viewer of the familiar classroom "ball and rod" representations of molecular structure.

The three uppermost spheres will be used for observation platforms, restaurants and other commercial purposes.

The remaining spheres will contain exhibitions by various nations demonstrating the peaceful applications of their atomic industry and research.

The Atomium is further set apart from anything done before by being balanced on one sphere at the corner of its cubical arrangement. Its seemingly precarious stability is strengthened by three exterior rigid pylons extending from ground level to a lower group of spheres.

Central axis of the cube stands on a 35-ft-dia circular foundation of 2-ft-thick reinforced concrete. This base rests on 59 steel piles, driven 55 ft deep, each capable of supporting 60 tons.

The structural members are made of high tensile strength steel. Skins of the spheres and connecting tubes are made of aluminum. Total weight of the structure will be 1,400 tons.

Each sphere can accommodate 700 persons. The main-axis tube will be equipped with the fastest elevator in Europe. It will lift 20 people at a speed of 90 fpm. The 10-ft-dia connecting tubes will incorporate escalators.

Creator of the Atomium is A. Waterkeyn, engineer and manager at the Federation of Belgian Metal Industries. A. and F. Polak are the architects, and Beckers and Joukoff, the consulting engineers.

Remote Control Power Plants Being Built in Brazil

Two remote control power stations—the first for Brazil—are now under construction in the state of Minas Gerais. Centrais Electricas Minas Gerais is

MILESTONES IN POWER PROGRESS

(NO. 1 IN A SERIES)

1885 — The first internal-combustion engine car — by Benz

1955—The first creative-packaging of dry-charged batteries was introduced by GLOBE

Historians disagree on the absolute birthday of modern motoring, but Karl Benz did build the first internal-combustion engine car. And there's no argument at all about Globe's *battery* contributions . . . not only pioneering dry-charged batteries, but first to package all elements *together* for the simplest, swiftest battery activation ever known.

It's this fast, this easy, this important . .

Open the compact carton, a complete package of charging ingredients • Take out each plastic bottle of *pre-measured* Spinning Power electrolyte — no waste, no guesswork, no time out to measure • For extra safety slip each bottle into the handy pouring sleeve • Your grip is firm as you snip the bottle nipple and — *Pour!* Battery is *ready for action* with *fresh power*. Because until that instant the battery has been inert — and because *method and ingredients are all together in one package.*

Another milestone in power — another ***first*** for Globe!

First for fast, low-cost delivery too!

Lightweight plastic electrolyte bottles and compact carton cut shipping costs. Furthermore, Globe's sixteen plants are strategically located for fastest, lowest-cost shipments to all markets — and thirteen (*) are producing dry-charged batteries.

*ATLANTA, GA., *DALLAS, TEXAS, *EMPORIA, KANSAS, *HOUSTON, TEXAS, *LOUISVILLE, KY., *MEDFORD, MASS., *MEMPHIS, TENN., *MILWAUKEE, WIS., *MINERAL RIDGE, OHIO, *PHILADELPHIA, PA., *REIDSVILLE, NO. CAROLINA, *SAN JOSE, CALIF., *HASTINGS-ON-HUDSON, N. Y., LOS ANGELES, CALIF., OREGON CITY, ORE., AJAX (ONTARIO) CANADA

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If it's Petroleum-powered there's a GLOBE-BUILT BATTERY right from the start!

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WISCONSIN ENGINES rank
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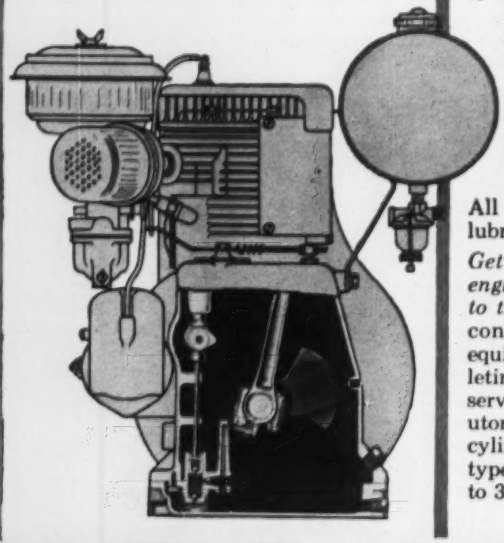

Lubrication systems on Wisconsin Heavy-Duty Air-Cooled Engines require less frequent attention, yet offer the best protection against engine wear. For example, the smaller models are supplied with a pump-circulated splash system, providing surest lubrication even when oil is at a very low level.

On larger models, a geared lubrication pump delivers an individual oil stream to each connecting rod. All other moving parts are lubricated by oil spray.

Get more service from the engine with less servicing to the engine. Specify Wisconsin Engines on your equipment. Write for bulletin S198, including handy service map, list of distributors and covering single-cylinder, 2-cylinder and V-type 4-cylinder models, 3 to 37 hp.

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. . . International

spending $25 million for the two stations plus expansion of an existing power plant, which together will up the company's generating capacity by 77,500 kw.

The first project will be at Camargos on the Rio Grande. When completed, a dam and power plant will supply 45,000 kw. The plant will be run from Itutinga, located downriver. Itutinga itself now has a capacity of 25,000 kw, that is to be raised to 50,000 kw by addition of two new generating units.

The other plant, at Caruju on the Para River, will add 7,500 kw to, and be tied in with, the existing station downriver at Cafanhoto. Only one or two men will be needed at the new unit to keep an eye open for emergency signals.

Summer Start Scheduled For Lake Maracaibo Bridge

Construction of a 5.4-mile rail and vehicular bridge over the outlet of Venezuela's Lake Maracaibo will begin July 1.

The proposed structure, scheduled for completion within 36 months, will have a central span 1,300 ft long flanked on each side by five 490-ft spans. Remaining spans will be 65 ft long.

Completion of the bridge in 1960 will provide the first land link between the city of Maracaibo and the rest of the country. (At present, traffic is ferried across.)

Maracaibo became a deep-water port with dredging of the ship channel last year, and the bridge is expected to further stimulate a boom that reportedly will boost the city's present population of 360,000 to 1 million by 1985. A string of oil towns lining the eastern lakeshore may be fused into one sprawling urban area when the bridge and a new lakeshore highway are completed.

Ten groups of construction companies that prepared designs and bids for the project last year have been invited to submit offers on new bridge plans drawn up by the Ministry of Public Works. Bids will be opened Mar. 7, but if offers exceed $96 million the ministry will build the bridge itself.

Bids ranging from $44 million to $97 million on 18 different designs were submitted in August, 1956. But all proposals—including several designs for a tunnel beneath the ship channel—were rejected.

Only those companies that made proposals last year will be eligible in the new bidding. They have been given preference because of their expenditures in preparing designs, and because other companies would not have time to formulate bids by Mar. 7.

Don't let your blueprints take the blame

TOO OFTEN costly production errors are blamed on hard-to-read blueprints. The real culprits, of course, are the old smudged drawings from which the prints were made.

However, a simple step makes such drawings capable of producing sharp, legible prints—*reproduce them on Kodagraph Autopositive Paper.* This photographic material gives you positive intermediates *directly* (no negative step)—sparkling intermediates even from soiled or weak-line originals.

Unlike your valuable drawings, they won't smudge or lose line density when used as "masters" in your print machine. They assure easy-to-read prints time after time—*pays you to make one of every drawing!*

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New LORAIN-85A

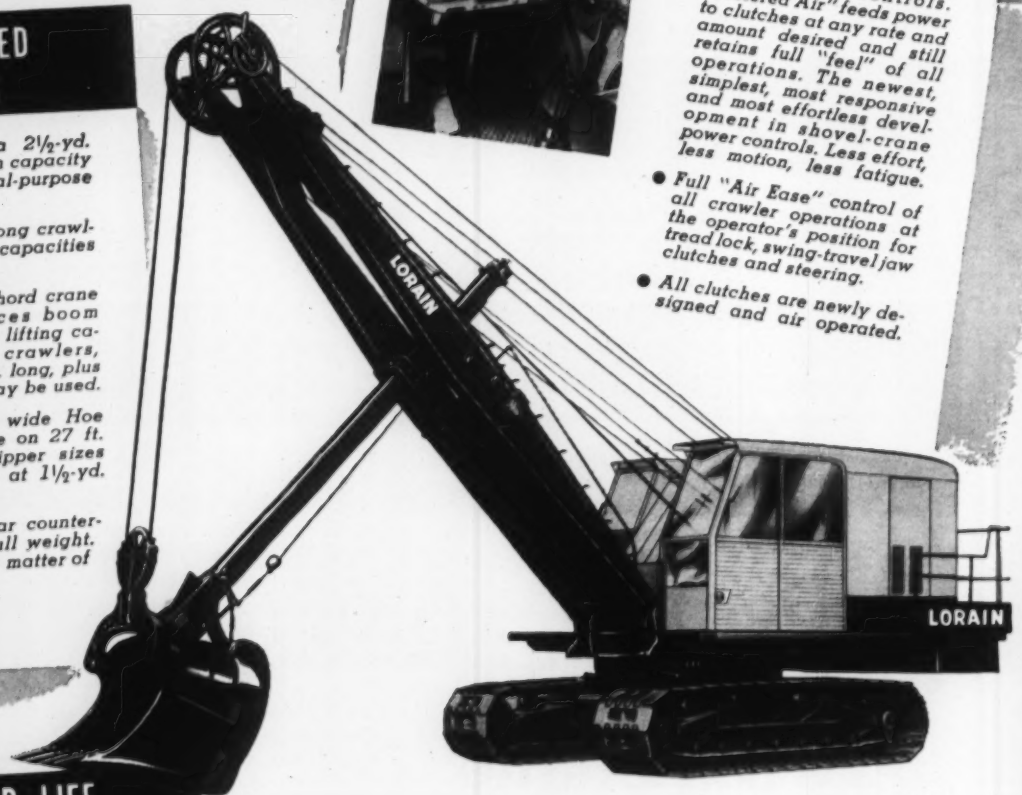
brings 2½-yd. shovel users new performance-profits!

"JOY STICK" AIR CONTROL for easier operation

- *Greater operating ease with 2-lever "Joy Stick-Air Ease" power controls. "Metered Air" feeds power to clutches at any rate and amount desired and still retains full "feel" of all operations. The newest, simplest, most responsive and most effortless development in shovel-crane power controls. Less effort, less motion, less fatigue.*
- *Full "Air Ease" control of all crawler operations at the operator's position for tread lock, swing-travel jaw clutches and steering.*
- *All clutches are newly designed and air operated.*

FOR INCREASED CAPACITIES

- *The Lorain-85A is a 2½-yd. shovel with 41 to 48-ton capacity as a crane on a general-purpose 2-speed crawler.*
- *An extra-wide, extra-long crawler provides for crane capacities of 50 to 60 tons.*
- *New square-tubular-chord crane boom design reduces boom weight and increases lifting capacities. On large crawlers, boom length to 200 ft. long, plus 40 ft. tip extension may be used.*
- *New 2½-yd., 62-in. wide Hoe bucket now available on 27 ft. boom. Other Hoe dipper sizes available beginning at 1½-yd. sizes.*
- *New, removable rear counterweight reduces overall weight. Can be removed in a matter of minutes.*



FOR LONGER LIFE LESS SERVICE COST

- *New Shear Ball mounting . . . the new idea in turntable mounting design. Turntable is secured to crawler and revolves easily and freely on a huge "ball bearing." No center pin or nut—no turntable rollers—with their adjustments, maintenance and lubrication.*
- *Torque converter power-take-off is available for the most efficient, smoothest method of taking full advantage of the abundant power supplied for turntable operations. "Never-say-die" power; adjusts automatically to digging needs; no shock; no stall.*
- *Generous use of anti-friction bearings throughout the new Lorain-85A. Used on hoist drums, swing drums and retract and crowd clutch drums. Crane boom head sheaves also on anti-friction bearings.*

Nothing has been spared in the new Lorain-85A to put it far ahead of the field in the 2½-yd. shovel-crane class. Every improvement, every refinement—from the new look in the new cab to the hidden anti-friction bearings—has been incorporated to give owners the last word in performance and profits. Many design improvements that increase capacity and result in easier, smoother operation enable the "85A" to live a longer, trouble-free life.

Don't miss seeing it. Ask your Thew-Lorain Distributor for all the facts and figures. Make every comparison. Only then can you appreciate the Lorain-85A built-in values that will pay you profits for a long time to come!

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN®

How to Cut Scaffold Mishaps

Almost 17% of all accidents to workers are caused by falls. The percentage of these falls resulting from scaffolding accidents can be greatly reduced by a few minutes devoted to proper maintenance, erection and the use of scaffolding.

Here are some safety practices recommended by the Patent Scaffolding Co., Inc., Long Island City, N. Y., scaffolding manufacturers:

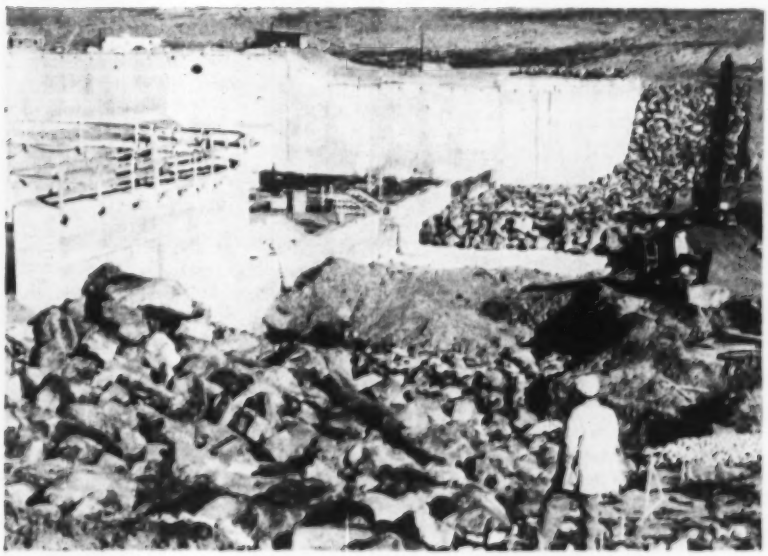
- **Sectional Scaffolds:**
  1. Keep scaffolds plumb and level at all times. Use adjusting screws rather than blocking.
  2. On exterior work, tie in to the wall every 25 ft of height and every 28 ft of length.
  3. Use guard railing at all heights.
  4. Never climb on cross braces.
  5. Set base plates on sills to spread the load on soft ground.
  6. Check all wing nuts and locks for tightness.
  7. Use horizontal cross braces in addition to diagonal braces.
  8. Make sure planking meets load requirements.
  9. Never use even slightly damaged material.

- **Rolling Scaffolds:**
  1. Lock all caster brakes when the tower is in working position.
  2. Height of working platform should not exceed four times the smallest base dimension.
  3. Do not extend adjusting screws fully.
  4. Provide sufficient horizontal bracing.
  5. Never allow any of the workmen to remain on the tower when it is in motion.

SIMPLE PRECAUTIONS to insure rigidity makes scaffolding safer.

- **Tube and Coupler Scaffolds:**
  1. Keep scaffold plumb and level.
  2. Tighten all coupler bolts before using scaffold.
  3. Tie fixed scaffolds to building or other firm support every 25 to 30 ft horizontally and every 25 ft vertically.
  4. Always use guard rails.
  5. Use sills when erecting on soft ground.
  6. Make sure planking is of good quality.

- **Suspended and Swinging Scaffolds:**
  1. Keep all bearing points well lubricated.
  2. Inspect ratchet and locking pawl springs to see that they are in good working condition.
  3. Keep the weight of men and the materials evenly distributed. Never overload.
  4. Reinforce the outriggers if the overhang exceeds the distance that is specified.
  5. Properly install toe boards and guard rails.
  6. Keep pawls engaged at all times, except when unreeling wire ropes or lowering scaffolds.
  7. Do not alter, remove or substitute parts.
  8. Overlap planks at least 1 ft on each side of Putlog.



How Derrick Stone Is Specified for Oahe

Twenty-two thousand tons of derrick stone are being placed at the downstream end of the stilling basin on Oahe Dam near Pierre, S. D.

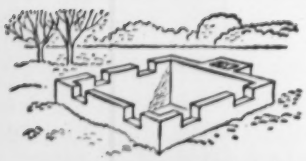
Oahe Area Engineer John W. Sibert, Jr., said the stone will prevent scouring of the discharge channel below the stilling basin.

Two-thirds of the stone, deposited cons ago by the great glaciers, is being acquired locally from landowners along the Missouri River a few miles from the damsite. The remainder will be quarried Sioux quartzite shipped from 170 miles away.

Specifications require that the glacial stone must weigh at least 160 lbs per solid cu ft. Fifty percent of the stones (by weight) must weigh 3 tons or more and 50% are to be roughly graded for weight between 500 lb and 3 tons.

The boulders must be generally square, rectangular or oval in cross-section with the least dimension not less than one-third the greatest dimension. They will extend downstream 75 ft from the stilling basin and will be placed to a depth of 10 ft.

Contract for the stilling basin is held by Pierre Constructors, a combine of Bruce Construction Co., Russ-Mitchell, Inc., and Wm. A. Smith Contracting Co. The basin is 64% complete with about 79,000 cu yd of concrete in place.



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for house foundations

EFCO Steel Forms for concrete construction are adaptable to wide use by their owners, including construction of house foundations. Other advantages:

- **Lifetime steel faces should never need to be replaced.**
- **Easy to handle and assemble.**
- **Saves time, material, money.**
- **Low original cost.**

Other forms from Economy are available on a rental basis. Write nearest office for catalog.

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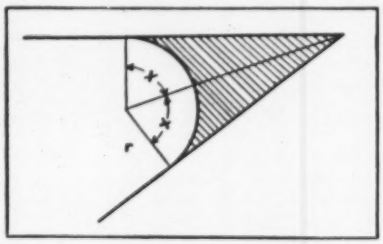
Spandrels of Circular Arcs



It is frequently necessary to compute the area between two tangential lines and a circular arc. Except for arcs of 90 deg, the usual books available do not give sufficient information on finding the area.

Below, the general formula for the calculation of such area is developed and approximations with the slide rule suggested.

In illustration, the area of the spandrel (shaded) can be derived by subtracting the sector area from that of the two triangles.

Let x be the half angle in radians.

Then, the area of the triangles is

$$2 \times \tfrac{1}{2} r(r \tan x) = r^2 \tan x$$

Also, the area of the sector is

$$\frac{2x}{2\pi} \pi r^2 = r^2 x$$

The difference (area of spandrel) is

$$r^2(\tan x - x)$$

For a particular case, trigonometric tables giving the tangents for angles measured in degrees, with radians also noted, are handy. Such tables can be found in O'Rourke's General Engineering Handbook for increments of ten minutes.

The table below shows the great variation of $(\tan x - x)$ with the half angle x.

For approximations of the value of $(\tan x - x)$ when the half angle x is 45 deg or less, tan x can be found on the slide rule, and the radians calculated.

For $x = 40°$

$$\tan 40° = 0.840$$

$$\frac{40}{180} \pi = 0.700$$

$$(\tan x - x) = 0.140$$

This compares with 0.1410 from the table.

For values of the half angle x of over 45 deg, the tangent can be found by dividing the sine by the cosine or the sine of 90° $-x$.

For $x = 80°$
sin 80° = 0.982
cos 80° = 0.173

$$\tan 80° = \frac{0.982}{0.173} = 5.68$$

$$\frac{80}{180} \pi = 1.40$$

$$(\tan x - x) = 4.28$$

This compares with 4.275 from the table.

—Paul Pennington, 849 Ridge Ave., Evanston, Ill.

New Map Folio Issued For Mississippi River

The 1956 annual edition of Flood Control and Navigation Maps of the Mississippi is now available from the Mississippi River Commission, Vicksburg, Miss.

The map folio covers the lower Mississippi from Cairo, Ill., to the Gulf of Mexico. Individual maps are to a scale of 1 to 62,500, or roughly one inch to one mile.

Included is a 36-sheet section with high- and low-water profiles of the riverbed; sketches of bridge clearances and principal locks; location of the channel line, the levee system, and a list of navigable waterways within the Lower Mississippi Valley Division.

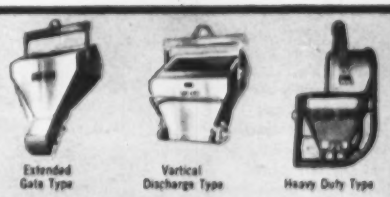
Copies may be obtained at $2 each, payable in advance, from the commission or the offices of the district engineers, St. Louis, Memphis, Vicksburg and New Orleans, Army Corps of Engineers.

Whole Angle	Half Angle x	tan x	x radians	$(\tan x - x)$
20	10	0.1763	0.1745	0.0018
40	20	0.3640	0.3491	0.0149
60	30	0.5774	0.5236	0.0538
80	40	0.8391	0.6981	0.1410
90	45	1.0000	0.7854	0.2146*
100	50	1.1918	0.8727	0.3191
120	60	1.7321	1.0472	0.6849
140	70	2.7475	1.2217	1.5258
160	80	5.6713	1.3963	4.2750

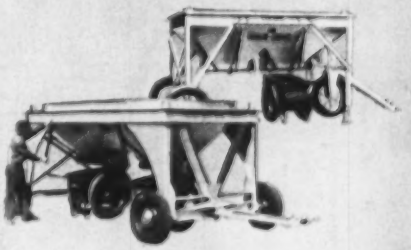
*This is the 90 deg value commonly found in handbooks.

ROUND CONCRETE BUCKETS
Select from 17 models of Gar-Bro Buckets ranging from ⅓ to 8 cu. yds. There are types for handling any concrete from normal slump to the driest low slump. All have Gar-Bro patented, self-closing, double clamshell gates—they are non-jamming and grout tight. Large buckets have air-operated gates with pull chain or remote control.

ACCORDION RUBBER HOPPERS (Patented)
Only Gar-Bro Buckets can be equipped with an Accordion Hopper. It is an exclusive patented bucket attachment that confines concrete when pouring into narrow forms. It fastens directly to gate and opens and closes with the gate.



LAYDOWN BUCKETS
They lay down and roll over to a low loading height and automatically resume a vertical position when lifted. 16 standard models ranging from ½ to 3 cu. yds. of three types to suit any job.



PORTABLE HOPPERS
6 Models with three types of mountings are available in the Gar-Bro line. They save truck mixer waiting time and prevent delay of the cart crew and finishers. Have low (70" to 75") loading height and 36" clearance for cart loading.

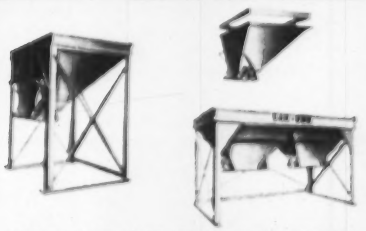
Only GAR-BRO offers

A COMPLETE SELECTION

of concrete handling equipment

ONLY GAR-BRO SPECIALIZES in concrete handling equipment. And only Gar-Bro has a complete line of more than 300 equipment items to give you a complete selection of types and sizes to suit your concrete placing job. Gar-Bro's 30 years of experience makes a big difference in the ease of operation . . . in the efficiency . . . and in the extra advantages of Gar-Bro equipment for concrete handling—there is no substitute.

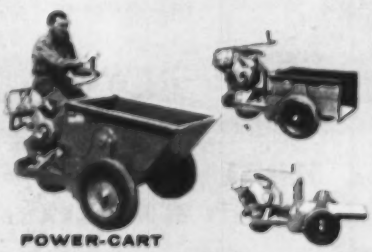
GAR-BRO MANUFACTURING CO. Los Angeles, Calif. • Peoria, Ill.
GENERAL OFFICES: 2415 E. Washington Blvd., Los Angeles 21, California



RECEIVING AND FLOOR HOPPERS
16 Hopper Units with capacities from 1 to 5.3 cu. yds. are convertible from a Receiving Hopper to a Floor Hopper by use of leg stands. Both vertical front and center discharge type are available in single or double gate types.

CONCRETE CARTS
All carts are not the same. Gar-Bro Carts are "balanced" — when loaded . . . easier to handle . . . easier to push. 3 sizes: narrow and standard 6 and also 8 cu. ft., rocker dumps.

COLLECTION HOPPERS
A Choice of 87 Items are available in Gar-Bro's line of Collection Hoppers and Concrete Chutes. Each is engineered by concrete handling experts to answer any concrete placing problem.



POWER-CART
Designed for Concrete Handling and for faster, safer operation on temporary runways. Handles 12 cu. ft. . . . turns in 4' radius . . . controls dumping . . . operates on 2 gal. of gas per day. Light and fast either forward or reverse.

Designed with concrete in mind...

GAR-BRO

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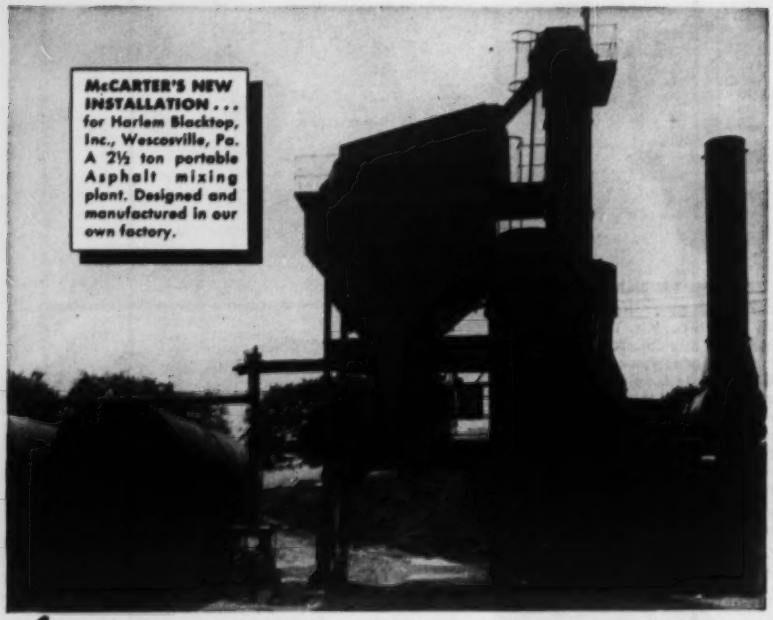
Write for catalog and Concrete Handling Manual.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McCarter Asphalt mixing plants are your answer . . .

SPEED Goes up fast, dismantles easily with a minimum of crew.

PRODUCTION Full flexibility for the individual customer or for high tonnage runs.

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INDIVIDUAL UNITS AVAILABLE Dryers (hot or cold material) Mixers, Buckets, Hoppers, Bins, Feeders, Collectors, Elevators and Steel Structures.

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There are many big reasons why you get greater value per dollar with Warren-Knight Transits and Levels. These many exclusive features of design and construction result in unexcelled accuracy—time-saving, ease and convenience in handling—tremendously low maintenance cost—longer instrument life—and great time and money savings in use. All these plus a lower price and direct shipment from the factory assures you THE GREATEST VALUE FOR DOLLAR OF INVESTMENT.

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Men and Jobs

Screvane Is Commissioner Of Sanitation Department

Paul R. Screvane has been appointed to the $25,000-a-year post of Sanitation Commissioner for the City of New York.

Screvane, 42, worked his way up through the ranks of the Sanitation Department, starting as a driver in 1936. He now will head a city department of 14,000 workers who daily haul 12,500 tons of refuse and have 6,000 miles of street to clean.

Currently executive assistant to outgoing Sanitation Commissioner Andrew W. Mulrain, Screvane will assume his new post when Mulrain's retirement becomes effective Feb. 28. Mulrain plans to go into private business as a consultant upon his retirement.

Engineering Chief Named For New England Division

John W. Leslie has been named chief of the engineering division, New England Division of the Army Engineers.

Brig. Gen. Robert J. Fleming, Jr., division engineer, said Leslie has been with the Corps for 20 years.

A native of Somerville, Mass., Leslie graduated from Massachusetts Institute of Technology in 1932 and entered government service with the U. S. Geological Survey and transferred to the Army Engineers in 1936. His experience has included flood control projects throughout New England, marine construction including the Castle Island Terminal and modification of the Boston Army Base.

(*M & J continued on page 244*)

Put your haulage requirements in experienced hands...

. the **SURE** hands of experience which have specialized in the manufacture of heavy duty trucks for over 53 years. Model 35SL (shown above) carries 35 tons (24 cubic yards, struck). 400 HP Diesel with down-hill retarding hydraulic torque converter. DART-designed-and-built 50,000 lb. front axle and 110,000 lb. capacity drive axle and DART'S famous box girder frame give this truck superior strength.

Model 10SL. DART'S Jr. Workhorse. 10 ton capacity, powered by 150 H. P. diesel driving through a double reduction rear axle. Tires are 12:00 x 20 all around. Hydraulic steering and torque converter, optional.

Model 25SL. The famous DART standard dump truck. 300-335 H. P. diesel engine and hydraulic torque converter with built-in down-hill retarding. Hydraulic power steering. Known and used the world over.

Model 35T. Payload of 35 tons (24 cubic yards, struck). 335 to 400 HP and hydraulic torque converter with built-in down-hill retarding. Heavy-duty 4-speed transmission.

***POWER* for the Climb — *SPEED* for the Haul Road**

HEAVY DUTY TRUCKS EXCLUSIVELY SINCE 1903

DART TONNAGE ENGINEERED TRUCKS

Kansas City 8, Missouri

D-128

SUBSIDIARY OF THE CARLISLE CORPORATION

THE COMPACTNESS and lightweight portability of UniViber makes it easy for one man to handle . . . small size makes it easy to transport in trunk of ordinary car.

Extra Man Eliminated by Using UniViber Plug-in Vibrator

Motor in head design eliminates the hours wasted by workman dragging motor after the operator and provides greater flexibility in job application.

Motor in Head

UniViber power is a universal type motor connected directly to the eccentric weight it rotates. It may be plugged into any standard 115 volt AC or DC source. The motor is cooled by wet concrete surrounding the head. Speed approaches 10,000 rpm. More work can be done in less time, and with minimum danger of damage to forms by using the high speed low amplitude type of vibrator pioneered by VIBER.

Particularly adaptable for use in hard-to-reach places, UniViber may be tossed into the concrete and pulled back toward you . . . the UniViber vibrator manipulates effectively and easily by using the casing as a handle.

Greater Flexibility in Operating Techniques Reduces Costs

Wires leading to the head are protected by a flexible casing which also functions as a convenient handle. The easy-to-handle UniViber vibrator gives the workman more freedom of action because absence of moving parts in the casing allows increased flexibility. This new freedom enables the operator to employ new cost saving vibrating techniques.

Two Models Available

UniViber Model 1M3R is equipped with the Viber patented replaceable rubber tip. Model 1M3 has housing with steel nose. One piece VIBER patented eccentric weight is tapered to produce minimum vibration where brushes ride on the commutator. Another feature is splash lubricated non-metallic separator bearings, used so successfully in other VIBER vibrators.

VIBER COMPANY is a pioneer in the design and development of both internal and external vibrators. For further information on VIBER'S complete line of vibrators, contact your authorized distributor or Viber Company, Dept. 7D9, 726 So. Flower Street, Burbank, California.

VIBER

VIBRATORS SINCE 1931

. . . Men and Jobs

Promotes Engineers

Two promotions in the Chicago office of the Illinois Central Railroad advanced Allen L. Sams to principal assistant engineer and T. Dabney Kern to office engineer.

Sams, a 1941 civil engineering graduate of Purdue University, has been office engineer for the last five years and prior to that was engineer of design. Kern, a 1949 civil engineering graduate of the University of Virginia, has been serving as division engineer of the Memphis terminal.

Careers . . .

Business

E. Warren Bowden has been elected executive vice president of Walter Kidde Constructors, Inc., New York. With the company since 1943, Mr. Bowden was previously assistant to the chief engineer, Port of New York Authority (1928-1939) and associated with the consulting firm of Parsons, Klapp, Brinckerhoff & Douglas (1939-1943).

Government

John N. Bills, a civil engineering graduate of Purdue University, has been appointed executive assistant to the general manager of the East Bay Municipal Utility District in Oakland, Calif.

H. E. Lewis, chief engineer of the Florida State Road Department, has resigned in order to supervise construction of the interstate highway program in the state.

Carlos D. Bullock, most recently regional structural engineer for the Portland Cement Association in Kansas City, has joined the Topeka, Kan., firm of Burgwin & Martin. He will serve as head of its structural and bridge department.

W. N. Dale has been named Oklahoma County (Oklahoma City) engineer.

B. A. Weiss, executive engineer and general superintendent of the Imperial Irrigation District, California, will begin new duties in April as engineer in charge of the resource development program being carried on in Iran by Development and Resources Corp. of New York City.

Kenneth C. Cox, chief engineer of Dravo of Canada since 1953, has been appointed manager and chief engineer. Other Dravo changes in Canada include Carl P. Ingwalson, estimator-engineer, who has been named chief estimator for Dravo of Canada; and Hugh N. Pendleton, Jr., named general superintendent of the general construction department.

(*M & J continued on page 246*)

Use the **APPROVED** high strength bolts **for structural steel** connections

RB&W quality confirmed by independent reports

HERE'S more assurance that you can depend on the strength and quality of RB&W High Strength Bolts in structural steel connections:

The independent, nationally known New York Testing Laboratories, Inc., examined the way RB&W makes these fasteners, tested random samples. Their findings: (1) The bolts conform to ASTM A325 specifications. (2) RB&W methods and facilities assure this quality consistently.

On top of this, the Committee on Test of N.Y.C. Board of Standards and Appeals also observed the RB&W manufacturing process from receipt of raw material to finished bolt. As a result, *RB&W High Strength Bolts are now approved for buildings in New York City* without need for erectors to file for exceptions under the Code.

RB&W high tensile bolts assemble easily. Once tightened to recommended minimum tension, they *stay* tight. Stronger than rivets in shear and in tension, they can be used anywhere, under all types of loads. The AISC approves. So do local codes everywhere.

Send for Bulletin HS-1 "How to work with high strength bolts" — as many copies as you can use. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N.Y.

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111th year

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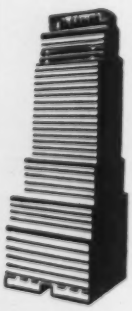

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. . . Men and Jobs

Joseph D. Lewin, for the last four years associated with the consulting engineer firm of N. A. Lougee & Co., of New York, has become assistant to the president of the DeLong Corp. in New York.

Retirements

Earl Withycombe, assistant state highway engineer, has retired after service that dates back to 1922. A specialist in paving operations, Withycombe rose to the post of construction engineer in 1947 and assumed his latest post in 1950. A civil engineering graduate of Oregon State College, he served in World War I with the Corps of Engineers.

Thomas J. Hewitt, chief of the engineering division of the Wilmington district, Corps of Engineers, after 43 years of service with the Corps.

Dr. J. H. Young, president of H. H. Robertson Co., after nearly 40 years in the construction business.

Roy R. Clark, special assistant to Col. Jackson Graham of the Portland district of the Corps of Engineers, after 23 years of federal service.

Bernard R. McBridge as district office engineer of the Indiana Highway Department at Fort Wayne, after 32 years with the state.

Associations

W. B. Drake of Lexington is the new president of the Kentucky section of the ASCE.

Lamar Richbourg is the new president of the Greensboro, N. C., Engineers' Club.

Donald J. Drake, Buffalo, N. Y., has been named president of the Niagara Frontier Builders Association.

Roy Roush, Fremont, is the new president of the Ohio Association of County Engineers.

Dewey S. Wright, Denver city engineer, has been elected president of the Colorado section of the ASCE.

Fred W. Bostleman is the new president of the Toledo, Ohio, Association of Home Builders.

Earle J. Wheeler is the new president of the Cincinnati Chamber of Commerce.

Hubert F. McDonell, assistant engineer for the Florida State Road Department, has been elected president of the Florida section of the ASCE.

F. J. Blythe, Jr., of Charlotte, was unanimously selected as president of the Carolinas branch of the Associated General Contractors.

Norman T. Buddine of Winston-Salem has been installed as president of the Professional Engineers of North Carolina.

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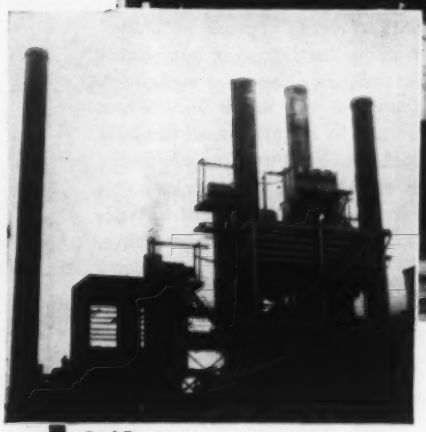

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The Ingalls Steel Construction Co.

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This is another example of Ingalls skill and ability . . . to meet fabricated steel requirements, for any type of construction, regardless of size or location.

Ingalls can serve you better . . . for complete information regarding *why* and *how*, write:

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Capacity has been increased nearly 70% at Ingalls' Plants within the past three years . . . part of a program designed to give Ingalls the facilities to meet every modern requirement for fabricated structural steel for any construction purpose.

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The Surveyor's Notebook

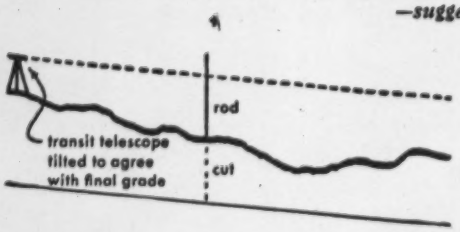
Reporting on Unusual Surveying Problems and Their Solutions

Notekeeper: W. & L. E. Gurley, America's Oldest Engineering Instrument Maker

FROM THE GURLEY MAILBAG:

A few tips on better instrument operation

—suggested by readers of "The Surveyor's Notebook"



On a light grade, the telescope on the level can be tilted to set such a grade, by using your leveling screws. *(This tip, illustrated above, has been sent in more frequently than any other to "The Surveyor's Notebook.")*

*

A hand level is very useful for checking instrument set-up elevation, particularly on steep grades.

*

When leveling, it is a good idea to have a pair of leveling screws oriented in the direction of the run. Any slight re-leveling can then be done with only one pair of leveling screws.

*

In making a sidehill set-up, the bottom plate can be kept nearly level by placing two legs downhill and one uphill. As a further suggestion, some engineers add one extension leg to their stiff-legged tripod to ease adjustment.

*

To be certain that all backlash has been taken out of upper or lower tangent and spring, lightly tap the edge of the plate with the index finger when making a setting.

*

Since the telescope level is usually about three times as sensitive as the plate level, it is suggested that the telescope level be used for accurate leveling of the transit.

A freshly chalked string appears to "shine" when sighted under conditions of hazy lighting, and is said to be more easily seen through a telescope than is a new white line. It is a good trick for use in heavy woods, on long sights against clothes of neutral hues or under other difficult conditions. Chalk can be given to each man carrying a plumb bob, with instructions to chalk the plumb line each morning.

*

It is suggested that the telescope be used in the inverted position frequently to avoid uneven axle bearing wear.

* * *

"Tips from The Surveyor's Notebook": *We have collected the most helpful, most discussed pages from Series One and Two of "The Surveyor's Notebook" in one 20-page book. These valuable field suggestions will help you use your own instruments with greater success. Write for your free copy.*

Gurley suggests...Covered Glass Reticles on Gurley transits and levels. You will be able to clean your reticle without the danger of destroying the fine lines. With the Gurley Covered Glass Reticle, any dust which may drop on the surface of the glass will not be in the focal plane of the crosslines. There can be no effect of a "spotted" reticle. *See your dealer, or write directly to Gurley for further details.*

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Unit Prices

Montana Irrigation Tunnel Costs $152.60 per Lin Ft

This $2,095,041 Helena Valley Tunnel and Canal near Helena is a Missouri River Basin Project of the Bureau of Reclamation in Canyon Ferry, Mont. The 7-ft horseshoe tunnel is 2.6 miles long and supported by steel and roof bolts. Tunnel lining is concrete and corrugated metal.

Guy H. James Construction Co., of Oklahoma City was successful in competing with six other bidders. The contract price is 15.8% below both the second low bid and the engineer's estimate. Theodore E. Mann is acting construction engineer.

The contract calls for 31,600 cu yd of tunnel excavation, priced $40 and $41 per cu yd. This accounts for 60% of the total. The remaining 40% includes canal excavation, open-cut excavation at the tunnel inlet, lining, supports, timbering and grouting.

Scheduled wage rates range from $1.90 to $3.00 per hour.

The seven bidders include:

1C Guy H. James Const. Co., Oklahoma City, Okla	$2,095,041
2 The Arundel Corp., L. E. Dixon Co., & Kemper Const. Co., Los Angeles, Calif	3,490,043
7 G. L. Tarlton Constr. Co., St. Louis, Mo.	3,678,510
EE Helena Valley Project Office, Helena, Mont	2,488,508

Bids: 11-27-56 Items	Unit	Quantity	Unit Prices 1C	2
Exc for canal	cy	26,000	$0.55	$0.50
open-cut, at tunnel inlet portal	cy	600	12.00	25.00
for culvert	cy	300	3.00	5.00
Compact embankments	cy	800	0.30	1.50
Backfill about structures	cy	350	1.00	3.00
compact	cy	200	3.00	5.00
Riprap	cy	30	5.00	12.00
Sand & gravel for riprap	cy	15	5.00	10.00
Exc in tunnel	cy	31,500	40.00	47.00
for tunnel enlargement	cy	100	41.00	63.00
Drill feeler or pilot holes ahead of tunn exc	lf	1,400	1.00	2.00
Tunn supports, stl, permt, f&i	lb	600,000	0.25	0.18
Timbering in tunn, permt, f&e	Mbm	200	250.00	300.00
Tunn roof suppt bolts, f&i	lf	14,000	1.50	2.50
Liner plates, CM, f&i	lb	50,000	0.25	0.30
Concrete in tunnel lining	cy	10,000	43.00	60.00
in structures	cy	100	80.00	100.00
Cement, f&h	bbl	15,150	6.00	6.75
Reinforcement bars, pl	lb	15,000	0.00	0.05
Drill grout holes through conc lining	lf	1,400	2.50	2.25
Grout pipes & conn, f&p	lb	1,400	0.70	1.10
Pressure grouting	cf	14,000	2.50	2.00
Weep pipes, f&i	lb	500	1.00	1.25
Metalwork, misc, f&i	lb	300	1.00	1.75
Discharge pipe conntr, f&i	ls	job	900.00	1,000.00
Rubber waterstop, type A, in joints, f&p	lf	82	3.00	2.50
RCP, culv, SS, 24", w type B joints, f&i	lf	80	8.00	15.00

Time to complete: 730 calendar days

Heavy Bidding on Kansas Sewerage System

Lewis, Kan., population 500, drew 10 bidders for its $33,802 sewage treatment plant and 13 for the $56,151 sewer system. Combined bids on both contracts were received from six bidders. The Ediger Engineering Co., Wichita, Kan., is the consultant.

Burt and Binford, Hutchinson, Kan., took a combination contract. Although their treatment plant bid was 1.3% above the low bid, they were lower than any other combination.

The treatment plant with lift station, Imhoff tank, sludge bed and oxidation pond is 14.5% below the engineer's estimate.

The 22,000-ft sewer line is 30% below the engineer's estimate and 6% below the second low bid. Vitrified clay and cast iron pipe, 6 in. in diameter, is laid in trenches with a maximum depth of 20 ft.

The contractor agrees to complete work in 160 calendar days. Other bidders required from 90 to 270 days for the job. Liquidated damages are $25 per day.

Bidders include:

Sewage Treatment Plant

1 Asplund Const. Co., Enid, Okla	$33,381
2C Burt & Binford, Hutchinson, Kan	33,802
10 Carey Const. Co., Wichita, Kan	43,188
EE The Ediger Engineering Co., Wichita, Kan.	39,648

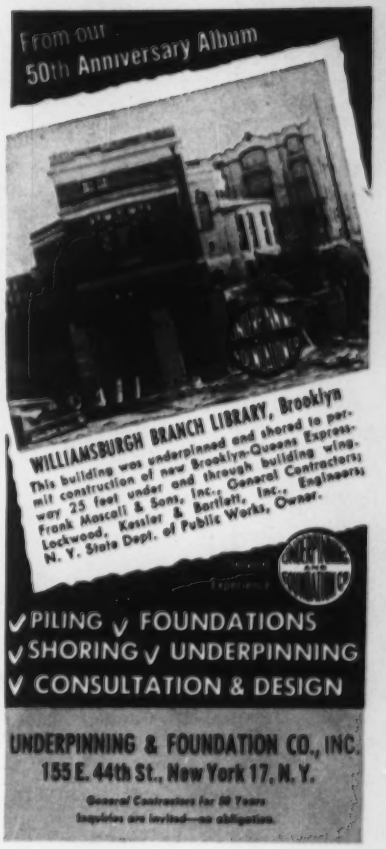
Bids: 11-29-56 Items	Unit	Quantity	Unit Prices 1	2C
Lift station, complete	ls	job	$9,000	$11,700
Imhoff tank, complete	ls	job	6,500	7,750
Sludge beds & sump well, compl	ls	job	3,500	2,750
Oxidn pond appurtncs, compl	ls	job	2,000	2,400
Exc for structures	cy	350	2.00	2.00
unclassified	cy	6,500	0.30	0.30
Agg binder surf road	sy	310	1.50	0.50
Concrete, ct 3	cy	1	50.00	50.00
Steel, reinforcing	lb	80	0.15	0.20
VCP, 8", ip	lf	432	2.00	1.60
6"	lf	18	2.00	1.40
CIP, 4", ip	lf	1,998	2.00	2.00
Manhole, std, 4'	ea	1	150.00	150.00
Chain link fence, ip	lf	600	3.00	2.20
Stock fence, ip	lf	1,897	0.60	0.50
Exc, wet, for struct	*cy	1	10.00	5.00
Time to complete:		1	2C	10
Calendar days:		240	160	150

Sanitary Sewer System

1C Burt & Binford, Hutchinson, Kan	$56,151
2 Griffin Const. Co., Merriman, Kan	59,754
3 Asplund Const. Co., Enid, Okla	61,181
13 Atlas Development Co., Tulsa, Okla	99,720
EE The Ediger Engineering Co., Wichita, Kan.	79,712

Bids: 11-29-57 Items	Unit	Quantity	Unit Prices 1C	2
VCP, 8", ip	lf	21,550	$1.10	$0.90
Y branch, 8x8", ip	ea	50	2.00	2.00
8x4", ip	ea	300	2.00	2.00
CIP, 8", ip	lf	355	4.00	4.00
Trenching & bkfl, 0- 8'	lf	6,996	0.35	0.50
8-12'	lf	8,750	0.55	1.00
12-16'	lf	5,529	0.95	1.50
16-20'	lf	915	1.55	2.50
Manhole, 4', std, 8' deep	ea	39	130.00	140.00
extr depth	lf	228	15.00	16.00
flushing, 8' deep	ea	26	155.00	160.00
extr depth	lf	38	17.00	17.00
Drop manhole, addnl	ea	15	25.00	50.00
Lamphole	ea	18	4.00	4.00
Boring	lf	115	3.00	2.00
Remove & repl bit pvmt	sy	844	4.00	1.00
Trenching, wet, addnl	*lf	1	3.00	4.00
VCP risers 8", ip	*lf	1	2.50	2.00
4", ip	*lf	1	2.50	1.90
Time to complete:	1C	2	3	13
Calendar days:	180	180	240	120

* * Additional items not to be added to tota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Materials and Labor Prices — Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Clay Products, Lime, Plaster, Paint, Roofing: Last, Jan 31; Next, Feb 28.
- Wage Rates, Building Board, Lath, Insulation: Last, Jan 31; Next, Feb 28.
- Cement, Aggregates, Ready-mixed Concrete, Asphalt: Last, Feb 7; Next Mar 7.
- Iron & Steel Products, Pipe: Last, Feb 14; Next, Mar 14.

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Atlanta †	**$83.00**	**$88.00**	**$77.50**	**$76.00**	**$87.00**	**$95.00**	**$150.00**	.....	.....
Baltimore *	**92.00**	**96.00**	**98.00**	**98.00**	**98.00**	**102.00**	**114.00**	.....	.....
	97.50g	*105.00g*	*123.00g*	*123.00g*	*123.00g*	*123.00g*	*133.00g*	*$144.00*	*$144.00*
Birmingham †	**87.00**	**89.00**	**82.00**	**89.00**	**92.00**	**97.00**	**112.00**	.....	.....
	107.00	*108.50*	*108.00*	*108.00*	*108.00*	*113.00*	*111.50*	*108.50*	*108.50*
Boston *	**100.00f**	**100.00f**	**108.00f**	**108.00f**	**108.00f**	**118.00a**	.....	.....	.....
	100.00n	*100.00n*	*117.00*	*117.00*	*117.00*	*122.00*	*125.00*	*184.00*	*140.00*
Chicago **	**94.00**	**97.00**	**91.00**	**105.00**	**113.00**	**114.00**	**109.00**	.....	.....
	104.00	*104.00*	*117.00*	*118.00*	*118.00*	*116.00*	*124.00*	*184.00*	*184.00*
Cincinnati *	**96.00**	**97.25**	**87.00**	**93.25**	**98.00**	**108.00**	**119.50**	.....	.....
	96.25	*97.50*	*102.00*	*104.00*	*105.00*	*108.50*	*130.00*	*130.00*	*130.00*
Cleveland **	**94.00**	**95.00**	**99.00**	**97.00**	**97.00**	**97.00**	.....	.....	.....
	.....	.....	*118.00*	*105.00*	*105.00*	*105.00*	*130.00*	*130.00*	*130.00*
Dallas k‡	**68.00**	**70.00**	**65.00**	**65.00**	**65.00**	**70.00**	**130.00**	.....	.....
Denver *	*Not in stock*		*135.00*	*135.00*	*135.00*	*140.00*	*150.00*	*160.00*	*160.00*
Detroit ‡	**116.50**	**119.50**	**114.00**	**117.00**	**122.00**	**127.00**	.....	.....	.....
	125.00	*125.00*	*120.00*	*122.50*	*120.00*	*125.00*	*185.00*	*195.00*	*195.00*
Kansas City *	**120.00**	**125.00**	**120.00**	**125.00**	**130.00**	**138.00**	.....	.....	.....
	130.00	*135.00*	*125.00*	*125.00*	*125.00*	*130.00*	*165.00*	*185.00*	*210.00*
Los Angeles i	*95.00*	*95.00*	*95.00*	*95.00*	*95.00*	*95.00*	*122.00*	*152.00*	*122.00*
Minneapolis #	*140.00*	*140.00*	*145.00*	*145.00*	*145.00*	*145.00*	*185.00*	*185.00*	*185.00*
Montreal ab	**90.00**	**100.00**	**90.00**	**90.00**	**108.00**	**125.00**	.....	.....	.....
	180.00	*180.00*	*180.00*	*180.00*	*180.00*	*180.00*	*170.00*	*170.00*	*170.00*
New Orleans †	**92.00**	**92.00**	**94.00**	**94.00**	**93.00**	**100.00**	**124.50**	.....	.....
†	*110.00*	*110.00*	*109.50*	*120.00*	*120.00*	*120.00*	*132.50*	*132.50*	*132.50*
New York *	**109.00**	**110.00**	**119.00**	**120.00**	**120.00**	**125.00**	.....	.....	.....
	.....	.....	*119.00*	*122.00*	*122.50*	*127.00*	*165.00*	*165.00*	*165.00*
Philadelphia ‡		**Range from $117.00 to $137.00**				**117/137**	**117/137**	.....	.....
		Range from $131.00 to $165.00				*131/163*	*156/158*	*165.00*	*165.00*
Pittsburgh 2	**130.00**	**140.00**	**130.00**	**155.00**	**140.00**	**145.00**	.....	.....	.....
	130.00	*140.00*	*130.00*	*155.00*	*140.00*	*145.00*	.....	*200.00*	*200.00*
St. Louis #	**115.00**	**117.00**	**125.00d**	**125.00d**	**125.00e**	**130.00e**	.....	.....	.....
	.....	.....	*132.00*	*132.00e*	*132.00e*	*136.00e*	*192.00e*	*192.00*	*192.00*
San Francisco A	*80.00*	*80.00*	*82.00*	*82.00*	*82.00*	*82.00*	*117.00*	*136.00*	*136.00*
Seattle †	*58.00*	*70.00*	*70.00*	*70.00*	*70.00*	*74.00*	*90.00*	*90.00*	*90.00*
Toronto a	**98.00**	**100.00**	**98.00**	**98.00**	**100.00**	**100.00**	.....	.....	.....
	114.00	*114.00*	*120.00*	*122.00*	*126.00*	*130.00*	*145.00*	*140.00*	*180.00*

	LONG LEAF Y. P. Merchantable grade up to 20 ft.		PLYWOOD Rail freight increment (See note for base price)	
	2x12 Rgh	12x12 Rgh	3/8"	1/4"
Atlanta †	.....	.....	**$22.32**	**$27.24**
Baltimore *	**$170.00**	**$185.00**	25.92	31.60
Birmingham †	**115.00**	**160.00**	21.78	26.58
Boston *	.....	.....	25.92	31.60
Chicago **	**137.00**	**137.00**	22.45	27.37
Cincinnati *	**141.75**	**141.75**	25.00	30.48
Cleveland **	.....	.....	25.37	30.93
Dallas k‡	**130.00**	**125.00**	18.72	22.80
Denver *	.....	.....	13.92	16.98
Detroit ‡	.....	.....	25.00	30.48
Kansas City *	.....	.....	16.56	20.16
Los Angeles i	.....	.....	16.61ab	*20.25ab*
Minneapolis #	.....	.....	19.89	24.25
Montreal ab	**123.00**	**123.00**	.....	.....
New Orleans †	**154.00**	**154.00**	18.72	22.80
†	**250.00**	**265.00**	25.92	31.60
New York *	**214/224**	**214/224**	25.92	31.60
Philadelphia ‡	**155.00**	.....	25.92	31.60
Pittsburgh 2	.....	.....	.....	.....
St. Louis #	.....	.....	18.72	22.80
San Francisco A	.....	.....	12.22	14.91a
Seattle †	.....	.....	.....	.....
Toronto a	**102.00**	.....	.....	.....
	.....	.....	.....	.....

† F.o.b. mill. * F.o.b. city, CL, out of yard. ** F.o.b. city, CL, direct mill shipment. ‡ Deliv. to contr. CL. 1. Retail, LCL, at yard. # Retail, LCL, deliv. 2. Deliv. truck lots. 3. aad., truckload lots, 8/8 M ft bm

LUMBER: Bold Face Type, Southern Pine. Italics, Douglas Fir. *a Spruce. *b Tax exempt. *c 5M lots. *d 8, 10, & 12 ft. lengths. *e 8 to 16 ft. lengths. *f Hemlock *g No. 1 common. *j 8ft. lengths. *k No. 3 common. *n #3. A incl rail rate from North west mills to San Francisco are $11.80 to $18.00 per M ft. bm. From Northern Calif. mills $9.00 by rail, $9.80 by truck. All rates for surfaced stock. For rough, add $3.00 to above figures.

PLYWOOD: Interior Fir Plywood, 4' by 8' panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on 3/8", $155.00; on 1/4", $173.00. Exterior 3/8", $163.00, 1/4", $183.00. For other centers add rail freight increment from table on proper size. Oiling and edge sealing charges included. *a Lower rate by water shipment. *b 80,000 lb. minimum.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS: Discounts from jobbers list, Feb. 1, 1950a Single or Double Strength A quality	WINDOW GLASS: Discounts from jobbers list, Feb. 1, 1950a Single or Double Strength B quality	EXPLOSIVES: Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 200 lb. lots*
Atlanta	78%c	78%c	$0.2540
Baltimore	74%d	76%d	.2540
Birmingham	83%	83%	.1990
Boston	73-10%	73-10%	.2540
Chicago	73%	73%	.2540
Cincinnati	74%	74%	.2540
Cleveland	74-2-10%	74-2-10%	.2940
Dallas	78%	78%	.2615
Denver	73%	73%	.2590
Detroit	74-10-10%	74-10-10%	.2540
Kansas City	76-10%	76-10%	.2590
Los Angeles	70%	76%	.2565
Minneapolis	71-10%	71-10%	.2590
Montreal	40-10-5%bc	40-10-5%b	22.05h
New Orleans	75%	76%	.2590
New York	79%	79%	.4425g
Philadelphia	74%	76%	.2540
Pittsburgh	73%	73%	.2540
St. Louis	72-10-10%	72-10-10%	.2590
San Francisco	60%	80%	.2540
Seattle	67%	70%	.2565

Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.

Glass: *a Jobbers' list price per box, 14 x 20, as, $42.78 for A quality, $37.50 for B quality; 14 x 20, da, $60.00 for A quality, $52.78 for B quality. *b Discount from list, Apr. 1951; sales tax included, but 8% tax exemption not allowable for. *c 77% for single strength *d Discount 6/18/52. *e 77% for double strength

Explosives: * Cartridges of 1¼", 1½", 1¾", 2", 2¼", 2½", 3" diameters. Urban prices influenced by service charges or local storage and delivery regulations do not consistently reflect quantity prices in less congested areas. *g In borough of Kings, Queens, and Richmond and in Manhattan south of Canal St., add delivery charge of $20.00 per trip. *h F.o.b Beloeil (near Montreal), per 100 lb. forcite, 40%. Forcite 60%, $23.80

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me.	$0.1990	$0.2340	$0.2540
W. of Miss. to Rocky Mtn. States, Fla. and Maine	.2040	.2390	.2590
Rocky Mtn. States	.2040	.2390	.2590
Pacific N. W. States	.2015	.2365	.2565
Pacific S. W. States	.1990	.2340	.2540

PILES, TIES F.O.B.

PILES

Prices per linear foot, fir and pine, bark off, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail: Pine*	By Rail: Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.51	....
12-in.—2-ft. from butt	6-in.	50 to 59-ft.	.54	....
13-in.—2-ft. from butt	6-in.	60 to 69-ft.	.58	....
12-in.—2-ft. from butt	6-in.	90 to 100-ft.	....	....
13-in.—3-ft. from butt	5-in.	91 to 100-ft.	....	....
14-in.—2-ft. from butt	6-in.	50 to 69-ft.	.50/.68	....
14-in.—2-ft. from butt	6-in.	70 to 79-ft.	.78/.88	.98
14-in.—2-ft. from butt	5-in.	80 to 85-ft.	.83/.93	.94
14-in.—2-ft. from butt	5-in.	85 to 89-ft.	....	1.00
14-in.—2-ft. from butt	5-in.	90 to 100-ft.	....	1.02

* Pine piling over 80-ft. available only in limited quantities

RAILWAY TIES

Prices f.o.b. per tie for carload lots:

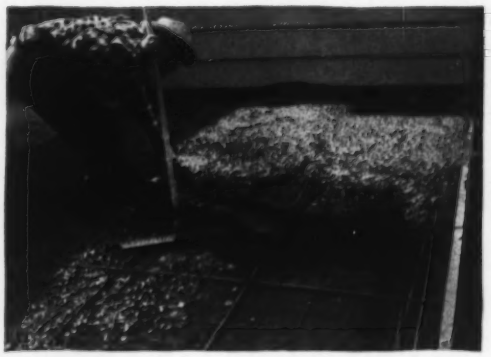
		8" x 8" x 8' Untr.	8" x 8" x 8' Tr.	7" x 8" x 8'6" Untr.	7" x 8" x 8'6" Tr.
Birmingham*	Hardwood, Grade 3	$1.70	$2.55	Gr. 5 $2.25	$3.33
	Grade 2	1.80	2.35	" 4 2.10	3.18
	Grade 1	1.15	2.00	" 3a 1.70	2.78
Chicago	Red Oak	.....	4.00a	.....	4.80a
New York	S. L. Sap Pine	2.00d	4.00d	3.00g	6.00g
	Mixed Oak	2.50d	4.50d	3.50g	6.50g
Philadelphia	Red Oak	2.95/3.15	4.50/4.70	3.60/3.80	5.50/5.75
St. Louis	White Oak	2.65	.....	2.95	.....
	Red Oak	2.55	3.25a	2.80	3.60a
	Sap Pine or Cypress	.....	3.15a	.....	3.55a
San Francisco	Douglas Fir	2.03ef	2.96ef	2.84bef	4.31caf

Tr.—Treated; Untr.—Untreated. a Creosoted. b 7" x 9" x 8'. c Empty cel d 6 x 8 x 8'6" e Green. f f.o.b. cars. g 7 x 9 x 8'6" * Add 75¢/tie freight charge t Birmingham.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb	$5.02
Chlorine cylinders, liquid, per lb. f.o.b. works	.103
Calcium chloride, 77-80%, flaked, 100-lb. paper bag, f.o.b. works, ton	29.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb	2.30
Soda ash, 58%, in paper bags, per 100 lb. dense	1.70
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works	1.85
Sulphate of copper, in bags, 99% per 100 lb. f.o.b. works	14.90



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9110

Financial Aid to Higher Education

A Fine Start, But...

This editorial has two purposes. The first is to salute American business for the fine start it has made in helping to relieve the financial plight of our colleges and universities. The second purpose is to stress the importance of having business provide more financial aid, and soon.

How Business Helps Higher Education

Business contributions to higher education doubled between 1950 and 1955. They jumped from $40 million to $80 million. Preliminary figures indicate they will be even higher this year.

Business firms have also shown a lot of ingenuity in devising different ways of making their contributions. The methods range from a matching of an employee's contribution to his particular alma mater to wide diffusion of the money through state and regional money-raising associations of colleges and universities. Thanks to this ingenuity, business firms now have a wide choice of ways by which to give effective aid. The way most appreciated by college administrators is the making of gifts unrestricted as to the purpose for which the money is used.

Imposing as it is, however, what business has done thus far is only a good start. Only a tiny fraction of the total number of business firms in the country are giving direct financial help to our colleges and universities; and this fraction includes fewer than half of the hundred largest corporations in the country. Also, the amount of financial help being provided by business constitutes only a very small fraction of what is needed.

Why Colleges Need More Aid

Right now our privately endowed colleges and universities need about $350 million more in operating income a year than they are receiving to enable them to pay decent faculty salaries and be in tolerably good working order otherwise. The reasons, including a severe decline in the purchasing power of their endowment income because of price inflation, have been dealt with in the previous editorials in this series.

In addition, these institutions, together with the tax-supported schools, are faced with a tremendous increase in enrollment over the years ahead. With both a rapidly increasing population of young people and an increasing propor-

tion of them going to college, this year's enrollment of 3.2 million students is expected to reach 4.0 million by 1960, and to be doubled by 1970.

For the next ten years our privately supported colleges and universities must have an average of about $400 million a year above what they can be expected to collect from tuition fees, income from endowment funds, etc.

This figure of $400 million does not include what is needed for new buildings and equipment. It also does not include help for tax-supported schools above what they get from taxes, fees, etc. Business has given and will continue to give these schools substantial aid. Indeed, almost 25% of the financial help from business for our colleges and universities went to tax-supported schools in 1955.

If aid from business met their needs for increased operating income, the privately supported colleges and universities would be given a decisive lift in performing successfully their part in our system of higher education. They would still have large needs of capital equipment — buildings, dormitories, laboratories — but help from other sources, such as that provided by devoted alumni, where they are well organized, could be expected to go far toward meeting these needs. Also some companies prefer to concentrate on meeting needs of this type.

What 1% of Profits Would Do

But do business firms have the capacity to fill the gap in adequate operating income for our privately endowed colleges and universities without putting an excessive financial burden on themselves? Those who have studied this capacity carefully say that the answer clearly is yes. If, of its profits before taxes — last year an estimated $43 billion — business were to devote 1% to helping our privately endowed colleges, it would take care of present operating needs of about $350 million a year. And the balance of $80 million would be a big step in meeting their needs for new buildings and equipment, too.

About one half of a 1% contribution of this sort would, in effect, be made by the federal government. Up to a limit of 5%, contributions of this type are exempt from the federal corporate income tax. For corporations with incomes above $25,000 per year this tax is 52%.

It is clear that not all business firms are in shape to devote 1% of their profits to aid to higher education. Even in this year of record-breaking prosperity, many of them will have no profits at all. But if business generally would take 1% of pre-tax profits as a target or benchmark for financial help to our privately endowed colleges and universities these institutions would again have sturdy financial foundations.

Relatively this is a very small price to pay (1) to insure a continuing supply of competently trained young men and women and (2) to buttress our freedom by assuring the successful survival of the privately supported sector of our system of higher education.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

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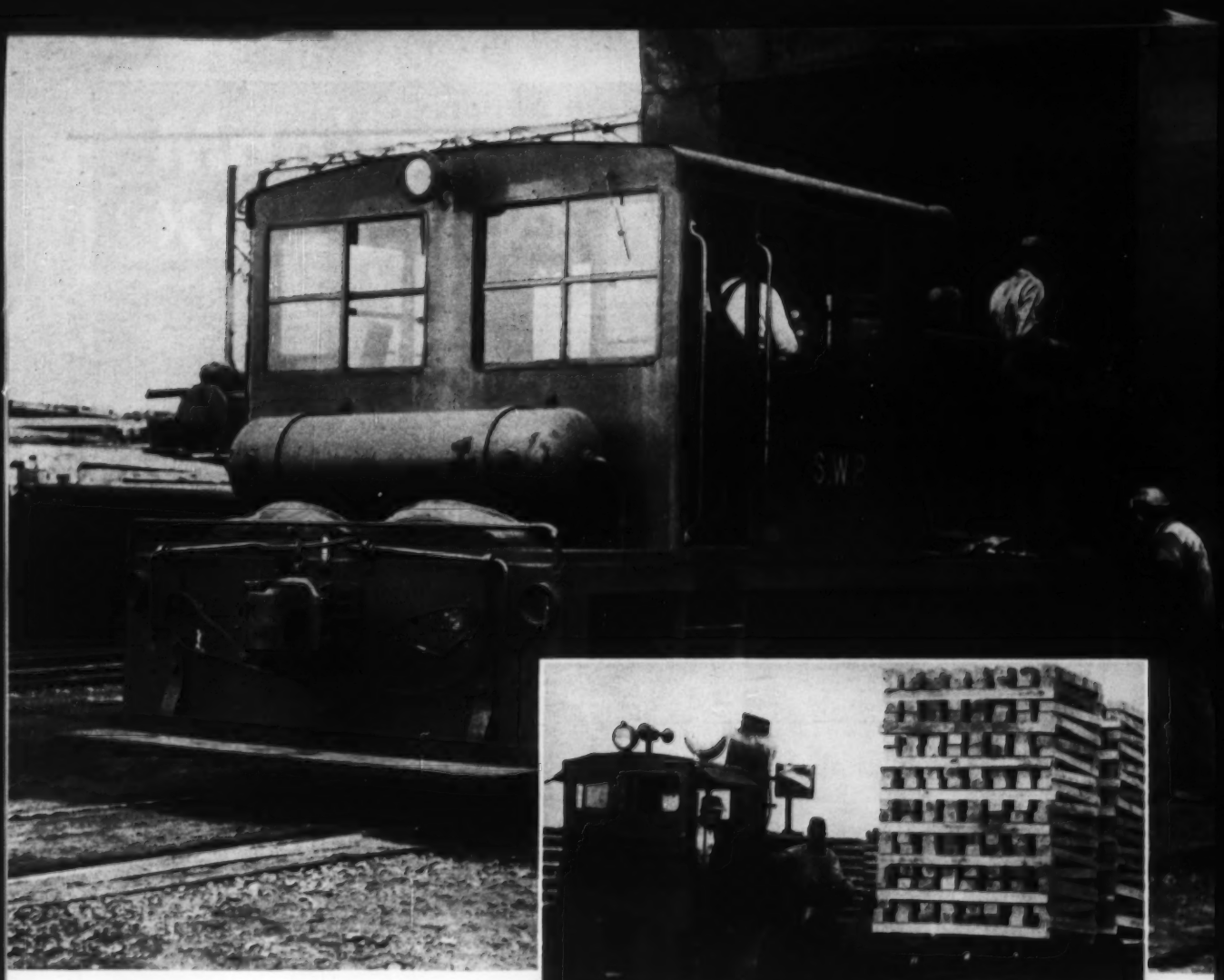

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J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

† **Connecticut**—BA 2/26—U. S. Eng., 150 Causeway St., Boston 14, Mass., maintenance dredging in West River, New Haven, CIVENG-19-016-57-71.

MASSACHUSETTS—BA 2/26—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
Adams—erect steel superstructure and constr. approaches bridge, Cook St., $42,000.
Clarksburg—constr. 3 span prestressed concrete beam bridge with approaches, $40,500. Plans deposit $10 each.
Fitchburg—repairs Rollstone St. bridge, $6,000. Plans deposit $5, refundable.

▲ **MASSACHUSETTS**—BA 2/26—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
Orange and Wendell—constr. hy. relocation Rte. 2, FAP F 348 (2), $1,140,000. Plans deposit $20, refundable.

MASSACHUSETTS—BA 2/26—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
Adams—hy. work Leonard St., $9,000. Plans deposit $10.
Claremont—hy. work, North Heath Rd., $27,000. Plans deposit $5.
New Bedford—relocated sect. Phillips Rd., F 120 (12), $96,000. Plans deposit $10. CD 10/29/54.

MASSACHUSETTS—BA 2/27—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
Milton—hy. and bridge constr., relocation Rte. 128, U 229 (2), $350,000. Plans deposit $10, refundable. CD 10/10.

† **Mass., Chicopee Falls**—METER PIT—BA 2/28—U. S. Eng., 150 Causeway St., Boston, Zone 14, modifications to existing meter pit, 1A, Westover Air Force Base, ENG-19-016-57-169, $5,000.

† **Vermont**—BA 3/7—U. S. Eng., 150 Causeway St., Boston, Mass., relocation of highway, Windham County, Hys. 30 and 8, Townsend and Jamaica, CIVENG-19-016-57-65. $900,000-$1,000,000. Plans deposit $25. Clarkeson Eng. Co., Inc., 285 Columbus Ave., Boston, Mass., engr. CD 1/31.

BUILDINGS—BA

▲ **Conn., Glastonbury**—SCHOOL—BA 2/25—Bd. Educ., Glastonbury, elementary school, Hebron Ave. $1,600,000. Lyons & Mather, 211 State St., Bridgeport, archts. CD 1/4.

† **Connecticut and Rhode Island**—SHOP—BA On Or About 3/1—U. S. Eng., 150 Causeway St., Boston 14, Mass., field maintenance shop with outside utilities at Milford, Conn., on Seeman Ave. between Bridgeport and Meadowside Sts.; A R & U shop with outside utilities at Orange, Conn., off U. S. Rte. No. 1 just south of intersection of U. S. No. 1 and State Rte. 162; field maintenance shop with outside utilities at Smithfield, R. I., within boundaries of north Central, State of R. I. airport; A. R. & U shop with outside utilities at Coventry, R. I., off Reed School Rd. near Providence, Kent County boundary line, ENG-19-016-57-154. $300,000-$400,000. Plans deposit $15.

Mass., Bellingham—SCHOOL—BA 3/5—Town, David L. Tuttle, supt. Schools, 14-classroom Bellingham Elementary School, Harpin St. $400,000. Plans deposit $50, refundable. Stoner Assoc., 53 State St., Boston, archts. CD 8/15.

Mass., Grafton—SCHOOL—BA 3/5—Town, c/o Supt. Schools, 3 Central Square, elementary school, Waterville St., North Grafton, $588,000. Plans deposit $100, refundable. Cambridge, Stubbins & Assoc., 806 Massachusetts Ave., Cambridge, archts. Goldberg-LeMessurier & Assoc., 667 Boylston St., Boston, struct. engrs. CD 9/10/56.

Mass., Sharon—SCHOOL—BA 3/7—Town, East Elementary School Bldg. Comm., Francis X. Mahoney, chn., c/o Supt. Schools, East Elementary School. $600,000. Plans deposit $70, refundable. J. Williams Beal & Sons, 185 Devonshire St., Boston, archts. Conrad & Son, 33 Union St. E., Walpole, engrs. CD 7/9.

▲ **Conn., Westport**—SCHOOL—BA 3/11—Town, School Bldg. Comm., Jessup Rd., high school, North Ave. $2,620,000. Sherwood, Mills & Smith, 65 Broad St., Stamford, archts. CD 11/28, under LB.

† **Mass., West Roxbury**—GARAGE—BA 4/2—Veterans Admin., Munitions Bldg., Wash., D. C., Garage Bldg. No. 10 addn., Veterans Admin. Hospital. $45,000-$65,000.

BUILDINGS—SLC

Mass., Dalton—PAPER MILL—Crane & Co., South St., soon lets contract 80x160 ft. masonry paper mill. $300,000. Charles T. Main Co., 80 Federal St., Boston, engr. CD 7/28.

▲ **Mass., Foxboro**—FACTORY—The Foxboro Co., Neponset Ave., soon lets contract steel only, factory addn. $75,000. Total est. $1,500,000. Korslund, Le-Normand & Quann, 506 Washington St., Norwood, archts. CD 4/27.

HEAVY CONSTRUCTION—LB & CA

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
Central Constr. Co. of Lawrence, and **Henley Lundgren Co.**, 193 Hartford Turnpike, Shrewsbury, Mass. CA **$1,662,192**, est. $1,980,646. F-120-11, constr. sect. of State Hy. Rte. 140, Freetown and Lakeville. CD 1/2, under LB.

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
Coleman Bros. Corp., 85 Sprague St., Readville, Mass. CA **$6,198,813**, est. $6,431,000. constr. sect. South East Expressway, Contr. C, FA-U 354C1, Boston. CD 1/17, under LB.

† **North Atlantic Dredging Co.**, 62 Condor St., East Boston, Mass. LB **$152,500**, est. $135,400. Impr., dredging Falmouth Harbor, ENG-57-57, MASSACHUSETTS. U. S. Eng., 150 Causeway St., Boston, Mass. Bids Jan. 31. CD 1/23.

Spinello Constr. Co., 249 Wallace St., Orange, N. J. LB **$105,006**, est. $110,000. Proj. 231, lining with cement mortar 11,100 ft. 36 in. steel water pipe, Lynn, BOSTON, MASS. State, Metropolitan Dist. Comm., Water Div., 20 Somerset St., Boston, Mass. Bids Feb. 7. CD 1/22.

† **Fontaine Bros.**, 40 Hendricks St., Chicopee Falls, Mass. LB **$767,060**, est. $800,000. airmen's dining halls, Westover Air Force Base, ENG-19-016-57-132, CHICOPEE FALLS, MASS. U. S. Eng., 150 Causeway St., Boston, Mass. McClintock & Criag, Inc., 458 Bridge St., Springfield, Mass., archt.-engr. Bids Feb. 6.

Trimont Bit. Products, 1840 Parkway, Everett, Mass. LB **$86,986**, est. $90,000. L-801 Contr. No. 4, pavement overlays and seal coating, Logan Airport, EAST BOSTON, MASS. State, Airport Management Bd., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. Bids Feb. 8. CD 1/24.

† **Campanella & Cardi Constr. Co.**, 780 Jefferson Blvd., Warwick, R. I. LB **$536,797**, est. $598,951. roads and utilities Otis Air Force Base, ENG-19-016-57-134, FALMOUTH, MASS. U. S. Eng., 150 Causeway St., Boston, Mass. Bids Feb. 7. CD 1/30.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England — **Middle West**
Middle Atlantic — **West of Mississippi**
South — **Far West**

PROPOSED WORK

Water Supply — **Public Buildings**
Sewers, Waste Disposal — **Mass Housing**
Bridges — **Commercial Buildings**
Streets & Roads — **Industrial Buildings**
Earthwork, Waterways — **Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.
CD dates shown are of Construction Daily issue in which last previous report was published.
OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
ENR Engineering News-Record
CD Construction Daily
For additional reports see Construction Daily.

CONNECTICUT—State P. Wks. Dpt. 165 Capitol Ave., Hartford,
Palmer Tarinelli Constr. Co. Inc., 144 Island Brook Ave., Bridgeport, Conn., LB **$374,000** (1 bidder) Proj. CP-S-51, enlarging service stations, Merritt Parkway, Fairfield, Greenwich and New Canaan. Bids Feb. 6. CD 1/21.

Combustion Engineering, Inc., 200 Madison Ave., New York, N. Y., LB **$115,902**. (2 bidders) Proj. BI-K-105B, boiler, Norwich State Hospital, NORWICH, CONN. State P. Wks. Dpt., 165 Capitol Ave., Hartford, Conn. Bids Feb. 6. CD 1/21.

BUILDINGS—LB & CA

Owner, c/o M. J. Maguire & Co., Inc., 11 Independence Ave., Quincy, Mass. Owner Builds. **$350,000**. Residential development "Sumner Heights", 20 HOUSES, Dedham St., CANTON, MASS.

H. Vincent Lindberg, 90 Electric Ave., Fitchburg, Mass. CA Approx. **$100,000**. two FACTORY addns., FITCHBURG, MASS. Cragin & Wilkins Co., Inc., 79 Nockege St., Fitchburg, Mass. Carl V. Aldrich, 46 Lincoln St., Hudson, Mass., archt.

N. D. C. Constr. Co., Inc., 124 Shawmut Ave., Boston, Mass. LB **$465,190**, est. $425,000. hy. admin. bldg., Rte. 2, LEXINGTON, MASS. Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, Mass. Bids Feb. 5. CD 1/23.

Sumner D. Hersey, 483 Main St., Medfield, Mass. Owner Builds. Approx. **$354,000**. residential development, 22 HOUSES, Center St., NATICK, MASS.

A. F. Smiley Constr. Co., 115 Trenton St., Pawtucket, R. I. CA Approx. **$100,000**. FACTORY, PLAINVILLE, MASS. D. E. Makepiece Co., div. Union Plate & Wire Co., Dunham St., Attleboro, Mass. Bids Jan. 29. CD 1/28.

▲ **Edmund J. Rappoli Co., Inc.**, 12 Norfolk St., Cambridge, Mass. CA Approx. **$1,100,000**. PLANT addn., 22 Baker Ave., WEST CONCORD, MASS. General Radio Co., 275 Mass. Ave., Cambridge, Mass. CD 1/31

DeVries Constr. Co., Inc., 72 Albion St., Wakefield, Mass. Owner Builds. **$360,000**. residential development "Winchester Estates", 12-14 HOUSES, Ridge St., WINCHESTER, MASS.

Horbal Bros. Inc., 395 Lower Lane, Berlin, Conn., CA **$530,000**. 53 HOUSES Webster Heights BERLIN, CONN. Universal Enterprises c/o Horbal Bros. Inc., 395 Lower Lane, Berlin Conn. Awarded Feb. 5

▲ **E and F Constr. Co.**, 94 Wells St., Bridgeport, Conn., CA **$2,000,000**. SUPERMARKET and BANK, North Ave., BRIDGEPORT, CONN. King Cole Stores, Inc., 162 Fairfield Ave., Bridgeport, Conn. Fletcher-Thompson, Inc., 211 State St., Bridgeport, Conn., archt.-engr. CD 4/29/48.

E & F Constr. Co., 94 Wells St., Bridgeport, Conn., CA **$400,000**. 2 story, brick CONVENT and parochial SCHOOL addn. BRIDGEPORT, CONN. St. Patrick's Parish 865 North Ave., Bridgeport, Conn. J. Gerald Phelan, 211 State St., Bridgeport, Conn. archt. Fletcher-Thompson Inc. 211 State St. Bridgeport, engr. Awarded Feb. 7.

▲ **Stone & Webster, Inc.**, 90 Broad St., New York, N. Y., CA Est. **$12,000,000**. Maromas Steam POWER PLANT addn., MIDDLETOWN, CONN. Hartford Electric Light Co., 266 Pearl St., Hartford, Conn. CD 1/19.

▲ **Turner Constr. Co.**, 38 Newbury St., Boston, Mass. CA Approx. **$1,000,000**. 1 story MANUFACTURING BLDG., NEW MILFORD, CONN. Scoville Brass Co., c/o contractor.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

New York—STATE PARK IMPRVS.—BA 2/27—Long Island State Park Comm., Administration Headquarters, Belmont Lake State Park, Babylon, Contr. No. 2, grading, drainage, paving expansion of Sunken Meadow State Park, Kings Park. CD 8/16/44.

† **N. Y. Brooklyn**—STEAM DISTRIBUTION SYSTEM—BA 2/27—Pub. Wks. Office, N. Y. Naval Shipyard, Bldg. 77, steam distr. sys., installing steam and return lines on Fifth St., N. Y. Naval Shipyard, NBy 8219, Spec. 8219/57.

Md., Towson—BA 2/28—Comrs. Baltimore Co., County Office Bldg., Contr. 545 S, sewage pumping station, Chesapeake Terrace; Contr. 544 S, sewage pumping station, 15th Dist. Plans deposit $5 each.

NEW JERSEY—BA 2/28—State Hy. Auth., 12 Broad St., Red Bank,
Monmouth Co.—Improvement of Settlement at Swimming River in Boro of New Shrewsbury and Twp. of Middletown, Garden State Parkway, Contr. No. 314, Sec. 7. Plans deposit $5.

▲ **NEW YORK**—BA 2/28—John W. Johnson, supt. Dpt. P. Wks., The Gov. Alfred E. Smith State Office Bldg., Albany, Zone 1,
Erie Co.—railroad relocation 1.25 mi., 9 in. c. conc. wide, 0.77 mi., b. conc. opt. 0.59 mi., misc. work 0.23 mi., R.R. and hy. separation comp. I-beam, 192.5 ft. ramp compt. I-beam 223 ft., 1.92 (0.92

(Continued on page 258)

Manitowoc KO's Rock!

Tight digging space no obstacle to big capacity champ

Tough volcanic rock has met its master in the rugged 2½-yd. Manitowoc shovel used by Morrison-Knudsen, Inc. during one construction stage of Dalles Dam. The job involves relocating 14 miles of road bed for the Seattle-Portland-Spokane Railroad. Well over a million yards of volcanic rock have to be excavated before the project is finished, and this unit will be on the job till the end. Working in extremely narrow quarters, the Manitowoc 3500 is moving over 2,000 yards daily of the unusually hard-to-handle heavy rock. Torque converter power assures smooth, steady digging; positive steering is a must in the tight working space; an all-cast, manganese Esco dipper (optional) is specially rugged for tough rock work. Here's a rough job calling for a machine having the guts and power of a real rock shovel, with the mobility of a small excavator.

Extremely clean, simple design of the Manitowoc shovel produces more bite at the dipper because no power is wasted. Only 17 gears and pinions are in the entire machine, with only working gears turning to get full capacity from every unit of horsepower. Exclusive sliding pinion arrangement uses one set of clutches to drive travel, swing and boom hoist.

Shovel boom is high-strength alloy steel . . . built to take severe twisting and bending under tough digging conditions. Twin dipper sticks are of reinforced box section design . . . roll through saddle blocks on four adjustable rollers, achieving full utilization of power.

Simple, fool-proof air controls help eliminate operator fatigue. Smooth torque converter power makes for a more efficient operating cycle. There's no stalling of the motor, no over-loading . . . power is perfectly balanced to the load. You get the most efficient use of your machine with torque converter power . . . pioneered by Manitowoc in excavators.

Take advantage of Manitowoc's superior features. Your helpful Manitowoc distributor can fill you in on the complete story. Call or write him today for literature and specifications!

Manitowoc Engineering Corp., Manitowoc, Wis.

MANITOWOC

SHOVELS 1-5½ YD. Speedcrane CRANES 20-100 TON

(Continued from page 256)

acc.), New York State Thruway Niagara Sect., sub. N5; elimination of grade crossing of New York Central R.R. and Porter Ave., city of Buffalo, Proj. I 865 (13), Contr. No. F1 NTC 57-11, PSC 9058. $1,586,000. Plans deposit $25; adv. ENR 2/21. CD 5/31/55.

N. Y., Greenburgh—BA 3/5—Town Bd., Town Hall, Tarrytown Rd., Elmsford, trunk line sewer, appurtenances in Donald Park Sewer District. Elizabeth C. Smith, town clk.; adv. ENR 2/21.

† Md., Bethesda—BLOW DOWN LINES—BA 3/6— Dist. Pub. Wks. Office, Potomac River Naval Command, Naval Gun Factory, Wash., D. C., renewal of blow down lines (5 boilers) and alterations to Bldg. No. 11, National Naval Medical Center, NBy 8360. CD 8/7.

† N. Y., Westhampton Beach—N.C.O. OPEN MESS—BA 3/6—U. S. Eng., 111 E. 16 St., New York, Zone 3, N.C.O. open mess at Suffolk County Air Force Base, ENG-30-075-57-4. $200,000-$250,000. Plans deposit $10. CD 8/22.

† New York—BA 3/12—U. S. Eng., 111 E. 16 St., New York, Zone 3, Tuscarora River bank protection, Addison, CIVENG-30-075-57-63, $40,000-$50,000. Plans deposit $5.

N. Y., Brooklyn—SERVICE GARAGE—BA 3/12—Office Chief Engineer of the Port of New York Auth., 111 Eighth Ave., New York, Zone 11, constr. maintenance and service garage together with paving and utilities therefor at Brooklyn-Port Authority Piers, Contr. BP-120-006. Plans deposit $30. CD 11/1/55.

New York—BA 3/13—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, Contr. A, constr. and equip., Contr. B, electrical work, Contr. C, plumbing work for Betts Avenue Incinerator extension, 53 Ave. and 58 Lane, Queens Boro. Plans deposit $50.

▲† N. Y., Westhampton Beach—RUNWAY EXTEN.—BA 3/14—U. S. Eng., 111 E. 16 St., New York, Zone 3, runway extension, hazard removal (FY 1957), Suffolk County Air Force Base, ENG-30-075-57-340, $2,000,000-$2,500,000. Plans deposit $25. CD 1/24.

N. J., Port Newark—BA 3/19—Office Chief Engineer of the Port of New York Auth., 111 Eighth Ave., New York 11, N. Y., constr. pavements and utilities for three transit sheds (Bldgs. Nos. 290, 291, and 292), on north side of city channel at Port Newark, Contr. PN-340.008. Plans deposit $30. CD 1/18/54.

N. J., Port Newark—TRANSIT SHEDS—BA 3/19—Office Chief Engineer of the Port of New York Auth., 111 Eighth Ave., New York 11, N. Y., constr. one, two or three transit sheds (Bldgs. Nos. 290, 291 and 292) on the north side of city channel, Contr. PN-340.007. Plans deposit $30. CD 1/18/54.

▲ NEW YORK—BA 3/21—John W. Johnson, supt. Dpt. P. Wks., The Gov. Alfred E. Smith State Office Bldg., Albany,

Essex Co.—wid'n., reconstr. 8.86 mi. sect. of Rte. 9 starting at Elizabethtown and exten. northward through Lewis to intersection with town road to Reber, existing 18 ft. wide road will be straightened widened to 24 ft. and resurf. with b. conc., $1,237,000.

reconstr. 2.26 mi. sect. of Rte. 9 starting in vicinity of north Hudson-Elizabethtown town line near Underwood and exten. generally northward toward New Russia to point about 1 mi. north of Rte. 9 and 73 intersection, several addnl. truck climbing lanes will be added to the regular two-lane 24 ft. wide concrete road on north end of proj., new improved channelized intersection will be constructed at the intersection north of Underwood, $811,000. Extended date. CD 2/4.

BUILDINGS—BA

N. Y., Harrisville—SCHOOL—BA 2/26—Harrisville Bd. Educ., elementary school, gymnasium and bus garage, $570,000. Plans deposit $50. Parker & Soper, Watertown, archts.

▲ Md., Annapolis—OFFICE—BA 3/12—State, Dpt. P. Imprvs., 506 Park Ave., Baltimore, Zone 1, stone, concrete, steel, masonry State Office Bldg. $3,000,000. Plans deposit $100. Rogers & Taliaferro, 18 West St., archts. Harder & Dressel, Glen Burnie, archts. CD 10/16/53.

HEAVY CONSTRUCTION—LB & CA

NEW YORK—John W. Johnson, supt. Dpt. P. Wks., The Gov. Alfred E. Smith State Office Bldg., Albany, Zone 1,

cancelled bids to have been opened Feb. 28, Interstate Rte. 5 (Mattydale-Brewerton) and access and local cross roads, incl. S.H. 452, S.H. 5470 and FASH 54-3, north Syracuse Connection (Rte. 11 to Inter. Rte. 5), Proj. I-1118 (6), U 463 915), 9.80 (8.53 Acc.), mi., FISH 57-6, FASH, 57-7, Onondaga Co.; adv. ENR 2/21. CD 2/4.

Joseph A. Lee Constr. Co., Inc., 2001 Nostrand Ave., Brooklyn 10, N. Y. LB $108,140 (8 bidders) renewal of pump discharge lines and relocation of air lines in Clark Street under-river tubes of Broadway-Seventh Ave. Line, Boros of Manhattan and Brooklyn, Contr. XD, NEW YORK. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids Feb. 8. CD 1/29.

▲ George F. Driscoll Co. & Moccia Constr. Co., 41 E. 42 St., New York, N. Y. CA $4,279,110. hotel at New York International Airport, IDLEWILD, N. Y. Port of New York Auth., 111 Eighth Ave., New York, N. Y. CD 5/8.

† Beacon Constr. Co., 102 Hano St., Boston 34, Mass. LB $389,000 (7 bidders) parachute and dinghy shop, Griffis Air Force Base, ENG-30-075-57-189, ROME, N. Y. U. S. Eng., 111 E. 16 St., New York 3, N. Y. Bids Feb. 7. CD 12/21.

Kaufman Constr. Co., Inc., 4000 Pulaski Ave., Phila. 40, Pa. CA $166,614. Bid 3939, bridge superstructure of Bridge No. 66 on line of Broad St. over Richmond Branch of Reading near Kerbaugh St., PHILA., PA. City, Dpt. Procurement, City Hall Annex, Phila., Pa. Bids Jan. 10. CD 12/31.

▲ MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,

Williams Constr. Co., Box 4045, Baltimore 20, Md. CA $2,827,072. surf. 3.883 mi. dual hy. Baltimore Co. Beltway, Contr. B 635-5-420, Baltimore Co. CD 12/18, under LB.

MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,

Empire Constr. Co., 31 S. Calvert St., Baltimore 2, Md. LB $436,003 (3 bidders) two dual 2 span steel beam bridges to carry Hagerstown by-pass over Martins Rd., 158 ft., Showalter Rd., 138 ft., near Hagerstown, Contr. 446-2-620, Washington Co. Bids Feb. 5. CD 1/24.

† Lloyd E. Mitchell, Inc., 4650 Reisterstown Rd., Baltimore 15, Md. CA $540,546. installing hypersonic wind tunnel equip., ENG-18-020-57-19, ABERDEEN PROVING GROUNDS, MD. U. S. Eng., 24 St. and Maryland Ave., Baltimore 18, Md. CD 1/31, under LB.

† Princemont Constr. Co., 11232 Triangle Lane, Silver Spring, Md. LB $217,525, est. $161,498 (5 bidders) Air National Guard Aircraft Parking Apron exten., ENG-49-080-57-47-(46), ANDREWS AIR FORCE BASE, MD. U. S. Eng., First and Douglas Sts. N.W., Wash. 25, D. C. Bids 2/5. CD 1/11.

† Alfred H. Smith, Branchville, Md. LB $82,575. resurf. roads at Naval Powder Factory, NBy-8370, INDIAN HEAD, MD. Dist. Pub. Wks. Office, Potomac River Naval Command, Naval Gun Factory, Wash., D. C. Bids Feb. 6. CD 1/30.

DELAWARE—State Hy. Dpt., Dover,

Standard Bitulithic Co., foot of Brill St., Newark, N. J. LB $495,259. wid'n., resurf. 7 mi. stretch of existing hy. from Ellendale to Milton, Sussex Co. Bids Feb. 6. CD 1/17.

BUILDINGS—LB & CA

▲ Uman Constr. Corp., 435 S. Main St., Freeport, N. Y. CA $1,449,000. HIGH SCHOOL addns., alterations, BABYLON, N. Y. Bd. Educ., Union Free School Dist. No. 1, Babylon, N. Y. CD 5/15.

Irwin A. Bohan, 25 Fowler Ave., Lynbrook, N. Y. CA Est. $500,000. CHURCH and RECTORY, BELLMORE, N. Y. St. Barnabas Church, Washington Ave., Bellmore, N. Y. Eggers & Higgins, 100 E. 42 St., New York 17, N. Y., archts. Awarded Jan. 8.

▲ Colmar Constr. Co., 364 Gold St., Brooklyn 1, N. Y. CA $1,701,000 (8 bidders) general constr. PUBLIC SCHOOL 11, Greene Ave. between Waverley and Washington Aves., BROOKLYN, N. Y. Bd. Educ., Bureau Constr., 42-15 Crescent St., Long Island City 1, N. Y. CD 1/11, under LB.

The name MATHEWS means the

THE MATHEWS MODERNIZED HYDRANT

The hydrant with the *replaceable* barrel. A Mathews broken in a traffic accident can be repaired in less than half an hour by inserting a new barrel without *excavating*. In addition this high-quality hydrant is very simply constructed. It is the *dry-head* type which functions under all conditions, because water, ice and sediment cannot reach key parts to clog operation.

MATHEWS HYDRANTS | made by

Chiappinelli-Marx, Inc., 15 S. Moger Ave., Mount Kisco, N. Y. LB **$221,000.** (10 bidders) County Assistant's OFFICE and STOREHOUSE, Dpt. P. Wks. Dists. No. 8, NEW CITY, N. Y. Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany, N. Y. Bids Feb. 7.

▲ **Diesel Constr. Co., Inc.**, 24 W. 58 St., New York 19, N. Y. CA Est. **$6,000,000.** 22 story OFFICE, 628-638 Third Ave. southwest corner of 41 St., NEW YORK, N. Y. 630 Third Ave. Corp., 555 Fifth Ave., New York 17, N. Y. CD 7/18.

Double-M Constr. Corp., 1776 Broadway, New York 19, N. Y. CA Est. **$850,000.** Robins Lane Elementary SCHOOL, SYOSSET, N. Y. Bd. Educ., Syosset, N. Y. CD 11/21.

Cadoux & Fuller, 3 Diamond Hill Rd., Berkeley Heights, N. J. Owner Builds. **$700,000.** 25 HOUSES forming White Birch Gardens on Mountain Ave., BERKELEY HEIGHTS, N. J. Erwin Gerber, 11 Commerce St., Newark, N. J., archt.

▲ **Fatzler Constr. Co.**, 653 S. 15 St., Newark, N. J. CA Est. **$1,630,000.** Clifford Scott SCHOOL, EAST ORANGE, N. J. Bd. Educ., 19 Winans St., East Orange, N. J. Awarded Feb. 1. CD 4/25.

Kruvant Constr. Co., Waldron Place, Montclair, N. J. Owner Builds. **$370,000.** 18 HOUSES on Orange Rd. at Ward Place, MONTCLAIR, N. J. William G. Chirgotis, 968 Stuyvesant Ave., Union, N. J., archt.

▲ **Housing Engineering Corp.**, 1229 Mount Royal Ave., Baltimore 17, Md. LB **$1,216,000.** construct and finance 91 HOUSING units, acmed services housing proj., New Cumberland General Depot, (Capehart), ENG-18-020-57-3, NEW CUMBERLAND, PA. U. S. Eng., 24 St. and Maryland Ave., Baltimore 18, Md. CD 1/29.

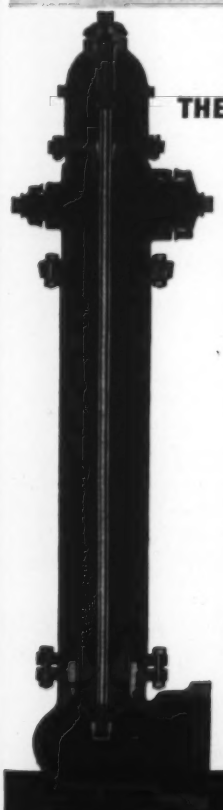
National Realty Co., 3004 Ridgewood Ave., Baltimore 15, Md. CA **$391,500.** 29 frame detached DWELLINGS, Huntsmoor Rd., BALTIMORE, MD. Arbour Manor Constr. Co., 3004 Ridgewood Ave., Baltimore 15, Md.

James Stewart Co., 230 Park Ave., New York 17, N. Y. CA brick, concrete, steel FACTORY addn., Taylor Ave., BALTIMORE, MD. Bendix Aviation Corp., Frieze Instrument Div., Taylor Ave., Baltimore, Md. CD 12/18.

▲ **John McShain, Inc.**, Chesapeake and Baltimore Aves., Baltimore, Md. LB **$3,190,000** (6 bidders) JUNIOR HIGH SCHOOL, BALTIMORE, MD. City, Bureau Bldg. Constr., 410 Municipal Bldg., Baltimore 2, Md. Bids Feb. 6. CD 1/22.

Joseph F. Nebel Co., 3408 Wisconsin Ave. N.W., Wash., D. C., CA **$488,660.** CHURCH addn., WASH., D. C. Mount Vernon Place Methodist Church, 9 and Mass. Ave. N.W., Wash., D. C. Bids Jan. 24, awarded Feb. 8. CD 2/1, under LB.

on hydrants
finest in fire protection



THE MATHEWS FLANGE BARREL HYDRANT

Another dry-head hydrant in which the stuffing box plate is cast integral with the nozzle section. The top section of this hydrant incorporates all features of the Modernized Mathews. As an optional feature furnished at slight extra cost, it is supplied with a breakable flange and stem coupling designed to snap when struck a heavy blow. These parts can be quickly replaced without excavating.

All available with mechanical joint and flange-type connections

R. D. WOOD CO.

Public Ledger Building, Independence Square • Philadelphia 5, Pa.

Manufacturers of "Sand-Spun" Pipe (centrifugally cast in sand molds) and R. D. Wood Gate Valves

SOUTH

HEAVY CONSTRUCTION—BA

† **Miss., Columbus**—DINING HALL—BA 2/26—U. S. Eng., 2301 Grant St., Mobile, Ala., 14,500 sq. ft. officers' dining hall, utility lines, 6,000 sq. yd. paving, roads and sidewalks, Columbus Air Force Base. CD 1/16.

† **N. C., New River**—BA 2/26—Dist. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk, addnl. water wells, Marine Corps Air Facility, NBy 3735, Spec. 3735/56. Plans deposit $25.

† **Va., Rosslyn and D. C. Wash.**—BA 2/26—National Park Service, Dpt. Interior, Interior Bldg., 19 and C Sts. N. W., Wash. 25, D. C., service drive and walks at Motor Boat Marina, Columbia Island, Wash., D. C. and paving yard at maintenance headquarters at Rosslyn, Va.

† **Fla., Jacksonville**—MOORING PLATFORM—BA 2/27—Officer in Charge of Constr., Bldg. 902 Naval Air Station, repairs to Type "C" mooring platform, remove batter piles and replace pull back into place and connect 2 steel batter piles, new piling welding, etc., Naval Fuel Depot. Plans deposit $10. CD 12/26/50.

† **Louisiana**—BA 2/27—U. S. Eng., foot of Prytania St., New Orleans, constr. turning basin and maintenance dredging consisting of 4,734,000 cu. yd., Calcasieu and Pass, Inv. 57-205.

† **N. C., Fort Bragg**—GRASSING—BA 2/28—U. S. Eng., 308 Customhouse, Wilmington, grassing at Pope Air Force Base, ENG-51-075-57-24. Plans deposit $1.20. CD 8/27.

† **S. C., Statesburg**—GAP FILLER FACILITY BLDG.—BA 2/28—U. S. Eng., Custom House, Charleston, unmanned gap filler facility bldg., ENG-38-081-57-21. CD 1/18.

† **Miss., Greenville**—CLUB—BA 3/5—U. S. Eng., 2301 Grant St., Mobile, Ala., club and patio for airmen, Greenville Air Force Base. CD 1/10.

La., Winnfield—BA 3/7—Mayor and Bd., Proj. 1, addns. to sewerage collection sys. and water distr. sys.; Proj. 2, elevated water tank. Plans deposit $25 Proj. 1, $5 Proj. 2. Barnard & Burk, 1023 Nicholson Dr., Baton Rouge, engrs. CD 6/16/52.

† **Ga. Augusta**—BA 3/19—Veterans Admin., Munitions Bldg., Wash., D. C., impry. water distr. sys., Veterans Admin. Hospital.

† **S. C., Myrtle Beach**—HOSPITAL—BA 3/20—U. S. Eng., Customhouse, Charleston, hospital, Myrtle Beach Air Force Base, ENG-38-081-57-25. CD 8/27.

BUILDINGS—SLC

Ky., Louisville—NURSES HOME—BA Norton Memorial Infirmary, Third and Oak Sts., nurses home addn. $400,000, Thos. J. Nolan & Sons, Kentucky Home Life Bldg., Fifth and Jefferson Sts., Zone 3, archts. CD 10/24.

HEAVY CONSTRUCTION—LB & CA

▲ **VIRGINIA**—The Richmond-Petersburg Turnpike Auth., 101E E. Main St., Richmond, Zone 2,
Villa Contracting Co., Inc., 233 North Ave., Westfield, N. J., CA **$2,737,964.** Contr. F-1-G, Section 4, grading, drainage, paving, structures 4.08 mi. from US Rte. 1, Dinwiddie Co. to Sycamore St., City of Petersburg. Dinwiddie Co. and City of Petersburg. Bids Jan. 3. CD 1/8, under LB.

▲ **VIRGINIA**—The Richmond-Petersburg Turnpike Auth., 101E E. Main St., Richmond, Zone 2,
E. G. Bowles, Contractor, 1506 Webster St., Richmond, Va. and **Wiley N. Jackson Co.**, P. O. Box 1408, Roanoke, Va., CA **$2,735,725.** Contr. A-4G, Sect. A, grading, drainage, paving, structures 2.01 mi. from vicinity of 1st and Baker Sts. to Robin Hood Rd. (excluding portion between Lombardy St. and S.A.L.R.R.) Richmond City. Bids Jan. 3. CD 1/8, under LB.

† **J. A. Laporte, Inc.**, 1101 Wilson Blvd., Arlington, Va. LB **$166,883.** (2 bidders) new work, maintenance dredging, waterways on coast, Accomac Co., CIVENG-18-020-57-12, VIRGINIA. U. S. Eng., 24 St. and Maryland Ave., Baltimore 18, Md. Bids Jan. 31. CD 1/14.

† **Mercury Electronics Co.**, 1060 Broad St., Newark, N. J. LB **$156,107.** (8 bidders) Distr. Sub-station No. 2, Shellbank area, Langley Air Force Base, ENG-44-110-57-15, LANGLEY AIR FORCE BASE, VA. U. S. Eng., foot of Front St., Norfolk 1, Va. Bids Feb. 6. CD 8/24.

▲† **Blythe-Conner Co.**, P. O. Box 1076, Norfolk, Va. CA **$1,466,000.** fuel accessories overhaul bldg. Naval Air Station, NOy 91410, Spec. 49896, NORFOLK, VA. Dist. P. Wks., Office, Fifth Naval Dist., U. S. Naval Base, Norfolk 11, Va. CD 1/31, under LB.

† **L. T. Zoby & Sons**, 1088 W. 42 St., Norfolk, Va. LB **$559,738.** (12 bidders) steam line to South Annex, Naval Base, NBy 3506, NORFOLK, VA. Dist. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk 11, Va. Bids Feb. 5. CD 12/19.

† **NORTH CAROLINA**—Bureau P. Rds., Dpt. Commerce, 1440 Columbia Pike, Arlington, Va.
W. B. Dillard Constr. Co., Box 904, Sylva, N. C., LB **$87,943** (4 bidders) Proj. 2G3, Blue Ridge Parkway concrete bridge with stone facing over Shults Mill Rd. Bids Feb. 7. CD 1/16.

† **Arrow Plumbing & Heating Co.**, Box 219, Durham, N. C. LB **$195,883.** rehab. of steam and condensate mains, Fourth Regimental 9th Increment, Marine Corps Base, NBy 3745, Spec. 3745/56,

CAMP LEJEUNE, N. C. P. Wks. Officer, Fifth Naval Dist., U. S. Naval Base, Norfolk 11, Va. Bids Jan. 24. CD 12/28.

▲ **GEORGIA**—Georgia Rural Roads Auth., 2 Capitol Sq., Atlanta,

GRRA—**Ocmulgee Constr. Co.**, McRae, Ga., LB **$95,269** grading, drainage, base surf., 7.649 mi., triple 8x6 ft. bridge culvert on Millen-Hilltonia Rd., Jenkins Co.; LB **$92,073**, grading, paving 1 bridge 4.733 mi. Broxton-West Green Rd., Coffee Co.;

GRRA—**C. W. Matthews Constr. Co.**, 119 Alexander St., Marietta, Ga., LB **$117,624** grading, paving 4.762 mi. Sandtown-Hicks Rd. and Old Alabama Rd. Cobb Co.; LB **$327,249**, grading, paving 14.084 mi. Cedartown-Young's Station Rd., Polk Co.;

GRRA—**G. H. Law Constr. Co.**, P.O. Box 461, Gainesville, Ga., LB **$232,000** base surf. 2.557 mi. SR 5; base and surf. 2 bridge culverts 6.684 mi. Clear Creek Rd., Gilmer Co.; LB **$223,902** grading, paving 8.428 mi. Oak Valley Rd. Quarry on SR 106-Carnes Church-Old Rock Quarry Rd., Stephens Co.;

GRRA—Knox Brothers, P.O. Box 311, Thomason, Ga., LB **$118,235**, grading, paving 5.97 mi. on SR 102-Mt. Zion Church Rd., Glascock Co.;

GRRA—**Shepherd Constr. Co. Inc.**, 1800 Briarcliff Rd. N.E., Atlanta, Ga., LB **$108,280**, grading, paving 7.646 mi. Godfrey-Buckhead Rd., Morgan Co.;

GRRA—**Southeastern Highway Contg. Co.**, P.O. Box 476, Gainesville, Ga., LB **$134,107**, paving, 2 bridges 10.699 mi. Preston-Cusseta Rd., Webster Co.;

GRRA—**Seaboard Constr. Co.**, Brunswick, Ga., LB **$153,363**, grading, paving 6.623 mi. Cate Rd. and 4 St.-Blynco Naval Air Station Rd., Glynn Co.;

GRRA—**M. R. Woodall Co. Inc.**, 1594 Lakewood Ave. S.E., Atlanta, Ga., LB **$120,029**, grading, drainage, base, surf. 4.27 mi. Keith-Tenn. Line Rd. Catoosa Co.;

GRRA—**M. D. Lovett**, Cuthbert, Ga., LB **$94,580**, grading, drainage, base, surf. 6.192 mi. Blakely to Quincy Rd., Early Co.;

GRRA—**A. H. Lawler Constr. Co.**, Perry Ga., LB **$104,487**, grading, drainage, base, surf. 5.499 mi. triple 8x8 ft. bridge culvert, Swainsboro-Nunez Rd., Emanuel Co.;

GRRA—**Bostick Constr. Co.**, Colonial Heights, Moultrie, Ga., LB **$137,169**, grading, drainage, base surf. 3.987 mi. and 107 ft. bridge on Nashville-Enigma Rd., Berrien Co.;

GRRA—**E. A. Hudson's Son**, 1730 Hollywood Rd. N.W. Atlanta, Ga., LB **$97,522**, base surf. 5.298 mi. Cassville-White Rd., Bartow Co.;

GRRA—**Wilkes Constr. Co., Inc.**, P.O. Box 593, Washington, Ga., LB **$147,323**, grading, drainage, base, surf. double 10x10 ft. bridge culvert 5.93 mi. on Lincolnton-Agnes Rd., Lincoln Co. Bids Feb. 8. CD 1/31.

▲ **GEORGIA**—State Hy. Dpt., 2 Capitol Sq., Atlanta, Ga.—**Ocmulgee Constr. Co.**, McRae, Ga., LB **$729,370**, grading, wid'n., resurf. existing pavement 15.24 mi. Athens-Commerce Rd., Clarke and Jackson Counties; LB **$202,531**, grading, paving 1 bridge 12.681 mi. Blackshear to Alma Rd., Pierce and Bacon Counties; LB **$736,120**, grading, wid'n., resurf. 21.454 mi. Louisville to Augusta Rd., Jefferson Co.; LB **$82,746**, grading, paving 3.994 mi. Cordele to Pineview Rd., Crisp Co.;

Ga.—**Cecil H. Dunn Constr. Co.**, P.O. Box 568, Moultrie, Ga., LB **$171,385**, grading, paving, 2 bridges 5.681 mi. Cordele-Hawkinsville Rd., Dooly and Wilcox Counties;

Ga.—**Kennedy Constr. Co.**, P.O. Box 266, Ashburn, Ga., LB **$116,524**, grading, paving, 1 bridge culvert 1.012 mi. on SR 125 Rd. in Hashville, Ga., Berrien Co.;

Ga.—**E. R. Snell Contractor & Stansell Bros. Constr. Co.**, Snellville, Ga., LB **$292,634**, grading, paving 8.238 mi. 1 bridge, 5 bridge culverts on Mayfield-Warrenton Rd., Hancock and Warren Counties;

Ga.—**Bryant Brothers**, Camilla, Ga., LB **$148,127**, grading, paving 4.838 mi., 1 bridge, 1 bridge culvert on Monticello, Fla. to Boston Rd., Thomas Co.;

Ga.—**G. H. Law Co.**, P.O. Box 461, Gainesville, Ga., LB **$253,187**, grading, paving 5.729 mi. road from SR 2 NW of Hiawassee southeasterly to SR 2 SE of Hiawassee, Towns Co.;

Ga.—**Acme Constr. Co.**, Cochran, Ga., LB **$131,295**, wid'n., resurf. 7 mi. Hawkinsville-Perry Rd. US Rte. 341, Houston Co.;

Ga.—**R. G. Foster & Co.**, P.O. Drawer 8, Wadley, Ga., LB **$85,289**, wid'n., resurf. 1.761 mi. Harlem-August Rd., SR 10, US Route 278, Richmond Co.;

Ga.—**Southern Road Builders, Inc.**, 2312 Ada Ramp, Walden Rd., Augusta, Ga., LB **$1,278,466**, grading, divided lighting sys. 0.733 mi. and 6 bridges on Aiken, S. C.-Augusta, Ga., Rd., Richmond Co. Bids Feb. 8. CD 1/31.

FLORIDA—State Rd. Dpt., Tallahassee,

Duval Eng. & Contg. Co., Box 1588, Jacksonville, Fla., CA **$745,896**, limerock base with b. conc. surf. course binder, c. conc., 3 concrete deck slab grade separation bridges 80.177 and 181 ft. length on concrete piling, etc. 0.263 mi. SR 5 (U.S. 1), between Forsyth St. and west Beaver St., in Jacksonville, Fed. Aid Proj. IN-003-7 (10), Job. 7202-280, Duval Co. Bids Jan. 15, awarded Feb. 4. CD 1/18, under LB.

† **P. Wks. Officer, Sixth Naval Dist.**, Bldg. 13, Charleston, S. C., rejected bids June 14, FY-1956, military housing, Naval Air Station NBy-4997, Spec. 4997/56, KEY WEST, FLA. LB **$531,576** Item 1; **$530,259**, Item 2; **$525,194**, Item 3; **$523,322**, Item 4. CD 6/20, under LB.

L. C. Morris, Inc., 2581 N.W. 72 St., Miami, Fla., LB **$65,000**, dredging Wagner Creek from N.W. 11 St. to N.W. 20 St., MIAMI, FLA. City Comn., City Hall, 3332 Pan American Dr., Dinner Key, Miami, Fla. Bids Feb. 6.

▲ **American Telephone & Telegraph Co.**, Brown-Marx Bldg., and **Southern Bell Telephone Co.**, 1706 2 Ave. N., both Birmingham, Ala. Owner Builds. **$2,500,000**. 7 tower radio relay system for long distance calls and TV from Birmingham to Decatur, Huntsville and Sheffield, ALABAMA.

LOUISIANA—State Hy. Dpt., Highway Office Bldg., Baton Rouge,

T. L. Ruston & Co., Inc., Ruston, La. CA **$625,285**. Bayou Lacassine Bridge and approaches, Jefferson Davis Parish. CD 2/1, under LB.

† **Perrilliat-Rickey Co.**, Box 13128, New Orleans, La. CA **$412,376**. airmen's dormitory, Lake Charles Air Force Base, ENG-57-9, LAKE CHARLES, LA. U. S. Eng., P.O. Box 267, Lake Charles, La. Bids Nov. 20, awarded Feb. 4. CD 12/3, under LB.

▲ **Boh Bros. Constr. Co.**, 2400 Cypress St., New Orleans, La. LB **$1,942,000**. (5 bidders) Contr. 179-W, Claiborne Ave. filtration plant and substructure of Claiborne Ave. pumping station, NEW ORLEANS, LA. Sewerage & Water Bd., 526 Carondelet St., New Orleans, La. Bids Feb. 6. CD 1/4.

▲ **TENNESSEE**—State Hy. Dpt., Nashville,

Tenn.—**Oman Constr. Co.**, Acklen Park, Nashville, Tenn. CA **$1,167,982**. concentrated calcium chloride crushed stone and bit. materials surf., constr. bridge over Clinch River 3.591 mi. sect. Secondary Rte. 2474, Proj. S 2774 (1), Anderson Co.;

Tenn.—**T. E. Gillespie**, Lebanon, Tenn. CA **$571,049**. rubble stone rip rap 1.09 mi. relocated State Rte. 30, in Athens, Proj. U 039-1 (8), McMinn Co.;

Tenn.—**Warren Brothers Roads**, 1900 Hayes St., Nashville, Tenn. CA **$686,937**. wid'n., resurf. 22.445 mi. sect. State Rte. 18, Proj. SP 1198-A, Hardeman and Madison Counties. Grand total $2,425,968. CD 1/24, under LB.

BUILDINGS—LB & CA

Cannon Constr. Co., Belle Haven Rd. and 10 St., Alexandria, Va. LB **$388,500** Base Bid. (7 bidders) North Graham Road Elementary SCHOOL, FAIRFAX, VA. Bd. Educ., Fairfax, Va. Bids Feb. 5. CD 1/16.

▲ **Hardin & Traver Contractors**, 1134 Dalon Dr N.E., Atlanta, Ga. LB **$1,572,628**. SCHOOL, North Druid Hills Rd., DECATUR, GA. DeKalb Co., Bd. Educ., 430 N. McDonough St., Decatur, Ga. Bothwell & Nash, 208 Roswell St., Marietta, Ga., archts. CD 11/5.

Louis Briggs Constr. Co., P.O. Box 1462, Macon, Ga. CA **$939,239**. 5 SCHOOLS, VIENNA, GA. State School Bldg. Auth., 244 Washington St. S. W., Atlanta, Ga. Bids Jan. 8, awarded Jan. 18. CD 1/14, under LB.

Bradford Builders Inc., 1101 Lincoln Rd., Miami Beach, Fla., CA **$611,444**. McNichol Junior High SCHOOL, 1411 S. 28 St., Hollywood, FORT LAUDERDALE, FLA. Broward Co. Bd. P. Instruction, 1320 S.W. 4 St., Fort Lauderdale, Fla. Bids Jan. 24, awarded Jan. 5. CD 1/31, under LB.

▲ **Jones Mahoney Corp.**, 1715 Lemon St., Tampa, Fla., LB **$1,887,500**. Proj. FLA. 8-CH-13 (D) MEN'S DORMITORY, University of Florida, GAINESVILLE, FLA. Florida State Bd. Control, University of Florida, Administration Bldg., Gainesville, Fla.

Grand Constr. Co. Inc., 1050 E. 25 St., Hialeah, Fla., CA Est. **$93,000**. 1 story, 121x200 ft., concrete block WAREHOUSE, 1055 E. 35 St., HIALEAH, FLA. Schatzberg & Crammer, 1051 E. 25 St., Hialeah, Fla. R. J. Schneider, 1431 Flamingo Way, Hialeah, Fla., archt.

▲ **Bradford Builders, Inc.**, 1101 Lincoln Rd., Miami Beach, Fla., LB **$1,139,904** Base Bid, Bunche Park JUNIOR-SENIOR HIGH SCHOOL, 1840 N.W. 157 St., MIAMI, FLA. Bd. P. Instruction, Dade Co., 275 N.W. 2 St., Administration Bldg., Miami, Fla. Bids Feb. 6. CD 1/21.

▲ **Duval Eng. & Constr. Co.**, 1746 E. Adams St., Jacksonville, Fla., LB **$1,082,785**. site imprvs. for MFG. PLANT and OFFICES, S. Orange Blossom Trail, ORLANDO, FLA. Glenn L. Martin Co., 500 Elwell St., Municipal Airport, Orlando, Fla. Bids Feb. 5. CD 2/5.

▲ **R. L. Bernardo & Sons**, 1089 Galloway Ave., Memphis, Tenn., LB **$5,619,500** (5 bidders) CITY HALL, CIVIC AUDITORIUM, 2 marinas, marine service facilities, parking areas, PANAMA CITY, FLA. City, City Hall, Panama City, Fla. Bids Feb. 7.

▲ **A. C. Samford & Co.**, Slappey Dr., Albany, Ga., CA **$2,729,000**. 7 story STATE OFFICE BLDG., MONTGOMERY, ALA. Alabama State Bldg. Comn., State Capitol, Montgomery, Ala. Bids Jan. 4, awarded Feb. 6. CD 1/8, under LB.

Otis W. Sharp & Son, Box 5164, New Orleans, La. LB **$418,000**, est. $342,186 (5 bidders) part 1 and 2 story, tile or concrete block, steel Jean Gordan Elementary SCHOOL at 6101 Chatham Dr., NEW ORLEANS, LA. Orleans Parish Police Jury, 703 Carondelet Bldg., New Orleans, La. Bids Feb. 5. CD 1/9.

Gurtler, Hebert & Co., 1539 Pleasure St., New Orleans, La. LB **$481,111** (8 bidders) 1 story, brick, 30,000 sq. ft. Ray Abrams Elementary SCHOOL, NEW ORLEANS, LA. Orleans Parish School Bd., 703 Carondelet St., New Orleans, La. Bids Jan. 31. CD 1/17.

▲ **Whittenberg Constr. Co.**, 2214 S. Floyd St., Louisville 17, Ky. CA **$1,341,000**. County High SCHOOL and STADIUM, OWENSBORO, KY. Daviess Co. Bd. Educ., Owensboro, Ky. Bids Jan. 29, awarded Feb. 5. CD 2/4, under LB.

Al J. Schneider Co., 3720 Seventh Street Rd., Louisville, Ky. CA **$575,000**. HOSPITAL addn., OWENSBORO, KY. Our Lady of Mercy Hospital, Junction and Ford Ave., Owensboro, Ky. Bids Jan. 4, awarded Jan. 31. CD 1/9, under LB.

▲ **Struck Constr. Co.**, 147 N. Clay St., Louisville, Ky. CA Approx. **$1,200,000**. PLANT, WINCHESTER, KY. Bundy Tubing Co., 8109 E. Jefferson St., Detroit, Mich. CD 2/8, under LB.

▲ **General Electric Corp.**, 570 Lexington Ave., New York, N. Y. LB **$1,046,550**. providing large TRANSFORMERS for steam plant's switchyard, MEMPHIS, TENN. Memphis Light, Gas & Water Comn., Memphis, Tenn. Bids Jan. 30, CD 8/26/55;

M. W. Kellogg Co., 711 Third Ave., New York, N. Y. LB **$517,900**. constr. rein.-con. chimneys (Memphis, Tenn.);

J. A. Jones Constr. Co., 401 Church St., Nashville, Tenn. LB **$705,000**. bldg. foundations for concrete chimneys and precipitator (Memphis, Tenn.).

Westinghouse Corp., 3 Gateway Center, Pittsburgh, Pa., LB **$260,890**. installation, provision of supervisory controls of transmission system for city's electric POWER PLANT, MEMPHIS, TENN. Memphis Light, Gas & Water Comn., City Hall, Memphis, Tenn. Bids Feb. 7. CD 8/26/55.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

Ill., Bloomington—BA 2/28—Bloomington & Normal Sanitary Dist., R.R. 3, sewage disposal plant addn., Bloomington and Normal. $110,000. Farnsworth & Wylie, 313 Unity Bldg., engrs. CD 12/2/53.

† **Michigan**—WATER SOFTENING SYSTEM—BA 3/6—U. S. Eng., 600 E. Jefferson Ave., Detroit, water softening sys. at AAA sites vicinity of Detroit.

† **Illinois**—BA 3/7—U. S. Eng., 420 Locust St., St. Louis 2, Mo., constr. railroad closure structure East St. Louis and vicinity (East Side Levee and Sanitary District), at intersection of Wabash R.R. with levee along south bank of Cahokia Creek Diversion Channel in Madison Co., 4 mi. southeast of Hartford, CIVENG-23-065-57-65. CD 11/9/55.

O., University Heights—SWIMMING POOL—BA 3/15—City, City Hall, swimming pool. $189,810. Plans deposit $25. Wm. Wiechelman, Jr., 7113 Euclid Ave., Cleveland, Zone 3, archt. CD 12/7.

O., Willoughby — BA 3/25 — Comrs. Lake Co., Court House, Painesville, replacing Penfield Bridge. $100,000-$150,000. R. M. Plummer, c/o owner, co. engr. CD 1/23, under LB.

BUILDINGS—BA

Ind., Trafalgar—SCHOOL—BA 2/26—Hensley School Bldg. Corp., Oak Davenport-Press Sts., elementary school. $500,000. Plans deposit $25. Hill & Wupper, Indianapolis Trust Bldg., Indianapolis, archts.

Mich., Flint—SCHOOL—BA 2/28—Bd. Educ., Kearsley School Dist. No. 14, Genesee and Richfield Rds., high school addn. Plans deposit $40 general constr., $40 mechanical and electrical work, refundable. MacKenzie, Knuth & Klein Archts., Inc., 708 Harrison St., Flint, archt. C. L. Toonder & Assoc., 24200 Grand River Ave., Detroit, Zone 19, engrs.

Mich., Flint—THEATER—BA 2/28—City, Bd. Educ., George D. Stevens, secy. 205 E. Eighth St., (A) Little Theater (B) planetarium of the Cultural Center. Plans deposit $25 general constr., $15 mechanical, $15 electrical, MacKenzie, Knuth & Klein, 708 Harrison St., Flint, archts. for theater. Smith-Hinchman & Grylls, Inc., 800 Marquette Bldg., Detroit, archt. for planetarium. CD 12/3/54.

O., Euclid—SCHOOL—BA 2/28—Bd. Educ., 23131 Lake Shore Blvd., Zone 23, 2 story Senior High School addn. plus two 1 story extens. $800,000. Plans deposit $50 general, $40 trades. Fulton & Delamotte Associates, 6014 Euclid Ave., Cleveland, Zone 3, archts. CD 11/11/55.

Ill., Chicago—NURSES' HOME and HOSPITAL—BA 3/5—Norwegian American Hospital, 1044 N. Francisco Ave., 5 story, brick student nurses' home and hospital addn. $400,000. Schmidt, Garden & Erickson, 104 S. Michigan Ave., archts.

▲ **Ind., Gary**—HOSPITAL—BA 3/5—Methodist Hospital, 540 Tyler Ave., 5 story, brick hospital. $1,750,000. Fugard Burt Wilkinson & Orth, 520 N. Michigan Ave., Chicago, Ill., archts. CD 2/28/56.

Mich., East Lansing—LABORATORY—BA 3/14—State, A. N. Languis, dir. State Bldg. Dpt., Lewis Cass Bldg., 300 S. Walnut St., Lansing, 2 story, 75x250 ft. control laboratory for Dpt. Agriculture, Michigan State University. Plans deposit $50, refundable. O. J. Munson Associates, 1110 S. Penn Ave., Lansing, archts. CD 10/22/54.

BUILDINGS—SLC

Ill., Genoa—WAREHOUSE—Leich Electric Co., 427 W. Randolph St., Chicago, soon lets contract, 1 story, 54,000 sq. ft. warehouse. $550,000. Pace Associates, 53 W. Jackson Blvd., Chicago, archts.

O., Vandalia—PLANT—Allison Div., General Motors Corp., Vandalia, O., soon lets contract, AEROW products plant, Argonaut Realty Div., General Motors Corp., 304 General Motors Bldg., Detroit, Mich., engrs.

Wis., Milwaukee—APARTMENT—S. Dwyer Building Corp., 10950 W. Capitol Dr., soon lets contract, 2 story, 35x55 ft. brick 8-apartment building. $480,000. R. E. Rasche, 601 W. Capitol Dr., archt.

Wis., Milwaukee—SHOPPING CENTER—S. Dwyer Bldg. Co., 10950 W. Capitol Dr., soon lets contract, 1 story, 250 and 135 ft. shopping center. $350,000. R. E. Rasche, 601 W. Capitol Dr., archt. CD 9/19.

(Continued on page 262)

Air-Tool Maintenance Tips That Help Keep Costs Down

by LE ROI

Not many machines take the beating that rock drills and paving breakers do. Steel strikes steel 2,000 blows a minute, with a cumulative impact of 40,000 foot-pounds every 60 seconds.

Despite the rough usage rock drills get, preventive maintenance pays off. Here are a few of the basic things you can do easily—to keep your tools running longer and keep your costs down.

★ ★ ★

Le Roi-Cleveland automatic air-line oiler and 10-ft whip hose. Capacity one quart.

(Right) New 2-gallon air-line oiler. Automatic. Designed for wagon-drill and jumbo service.

See that your machines get plenty of oil. This is of vital importance. There are no piston rings in a rock drill, so the piston must fit the cylinder with practically zero clearance. If lubrication is neglected, hardened steel parts score and break.

Fill the integral lubrication chamber in the drill at the start of each shift and after every 3 hours of operation. Better yet, use a Le Roi-Cleveland air-line lubricator placed 10 feet from the machine. This type of lubricator needs filling only once each shift; the flow of oil can be adjusted as desired.

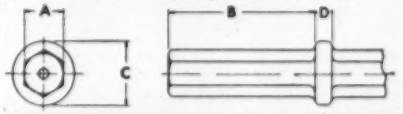
Le Roi-Cleveland Veribest rock drill hose. Oil- and heat-resistant.

Use only good hose and pipe. Pieces of rubber from oil-rotted hose will clog your drill so that it can't run. Scale from old rusty pipe can score the cylinder of your machine and result in expensive repairs.

We recommend the use of Le Roi-Cleveland "Veribest" hose. It was designed especially for rock drill service, with an abrasion-resistant outer cover and a special inner liner that resists the corrosive action of oil and hot air.

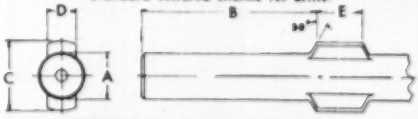
Be sure your drill steel shanks are properly sized and tempered. Undersized shanks cause rapid chuck wear that leads to broken pistons. Short shanks and long shanks reduce the force of blow — slow down your drilling. Shanks that are too soft stick in the machine. And, when they are too hard, they cause the piston to spall. This may ruin a drill cylinder. Poor shanks are expensive.

Follow these diagrams for correct shank sizes and temper them in oil.



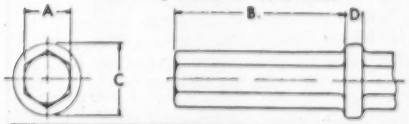
NOMINAL SIZE	A	B	C	D
⅞ HEX. x 3¼	⅞	3¼-3⅜	1⅜	⅜
⅞ Q.O. x 3¼	⅞	3¼-3⅜	1⅜	⅜
1 HEX. x 4¼	1	4¼-4⅜	1½	⅜
1 Q.O. x 4¼	1	4¼-4⅜	1½	⅜

Standard collared shanks for drills.



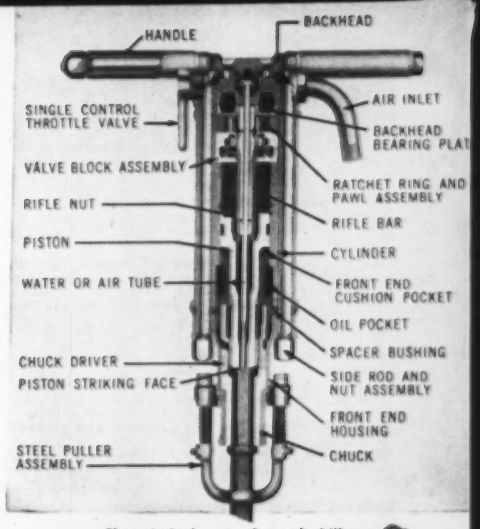
NOMINAL SIZE	A	B	C	D	E
1 LUG	1	3 13/16-3⅞	1½	⅝	1
1⅛ LUG	1⅛	3 13/16-3⅞	1¾	¾	¾
1¼ LUG	1¼	3 13/16-3⅞	1⅞	13/16	¾
1½ LUG	1½	5 -5⅛	2¼	1	1

Standard lug shanks on round steel.



NOMINAL SIZE	A	B	C	D
1 HEX. x 4¼	1	4¼-4⅜	1½	⅜
1⅛ HEX. x 6	1⅛	6 -6⅛	1¾	½
1¼ HEX. x 6	1¼	6 -6⅛	1¾	½

Standard collared shanks for paving breakers.



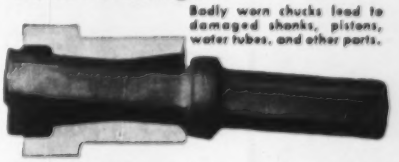
The principal parts of a rock drill.

Keep the striking faces of pistons and shanks square. In time, wear will tend to cup the piston face. When this occurs, the face should be ground until it is flat. Shanks should be square, too, if excessive piston damage is to be avoided.

Correctly faced pistons and shanks stand unsupported.

Don't use worn chucks. A worn chuck allows the drill steel to become misaligned in the machine. As a result, the piston strikes the sharp corners of the drill shank, and you have the cost of a broken piston in addition to the loss of footage.

Badly worn chucks lead to damaged shanks, pistons, water tubes, and other parts.



Use sharp bits. Dull bits bind in the hole and slow down the drilling. They also cause excessive strains on the machine and rapid wear of all rotating parts.

Le Roi-Cleveland one-use CRD detachable bits.

Le Roi-Cleveland developed the "one-use" CRD detachable bit, so that rock-drill operators can use sharp bits all the time at a considerable saving.

• • •

Yes, preventive maintenance pays off. If you'd like to post these tips as a reminder to your drill runners, a supply of reprints will be sent you free of charge. Just write for them.

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

89-58

(Continued from page 260)

HEAVY CONSTRUCTION—LB & CA

Foley Constr. Co., 5050 Orchard St., Cincinnati, O. LB **$737,244**, est. $632,000. (2 bidders) Sect. 5, east branch of Ohio River Interceptor, CINCINNATI, O. City, City Hall, Cincinnati, O. Havens & Emerson, Leader Bldg., Cleveland, O., engrs. Bids Feb. 5. CD 1/10.

Walker-Fauber, Ashland, O., LB **$501,470** (3 bidders) Hubbard-Liberty Sewage Disposal Sys. WARREN, O. Trumbull Co., Court House, WARREN, O. Bids Feb. 4. CD 1/24.

▲ **Marcelletti & Sons Constr. Co.**, Bedford, O. CA **$1,842,334**. Contr. 108, approx. 9 mi. water mains, YOUNGSTOWN, O., Mahoning Valley Sanitary Dist., Box 298, Youngstown, O. Bids Jan. 29, awarded Feb. 1. CD 2/1, under LB.

▲ **ILLINOIS**—Illinois State Toll Hy. Comn., 20 N. Wacker Dr., Chicago,

Arcole Midwest Corp., 3225 Main St., Skokie, Ill. CA **$1,399,808**. (10 bidders) Contr. N-5A, grading, drainage, paving with appurtenances, precast concrete girder bridge over Fox River, Kane Co. CD 12/28, under LB.

▲ **ILLINOIS**—State Div. Hys., Centennial Bldg., Springfield,

S. J. Groves & Sons Co., 1104 W. Reynolds St., Springfield, Ill., CA **$1,577,210**. 1.06 mi. earth grading in East Peoria, Tazewell Co. Bids Jan. 22. CD 1/28, under LB.

Standard Paving Co., 308 W. Washington St., Chicago, Ill., LB **$102,357** paving, BERWYN, ILL. City, City Hall, Berwyn, Ill.

ILLINOIS—State Div. Hys., Centennial Bldg., Springfield, **McCann & Co., Inc.**, and **Calhoun County Contg. Corp.**, 2145 Divereaux St., Springfield, Ill., CA **$952,982**. grading 0.25 mi. 3 grade separation structures, FAI Route 5 Peoria, Peoria Co. Bids Jan. 22. CD 1/28, under LB.

ILLINOIS—State Div. Hys., Centennial Bldg., Springfield,
rejected bids Jan. 22, bit. surf. 2.35 mi. F.A.S. Rte. 782 from Ill. Rte. 127 west of Keysport and 3-span girder bridge over Flat Branch Creek, Clinton Co., LB **$202,609**. CD 12/8, under LB.

▲ **Consolidated Constr. Co.**, 101 W. Wells St., Chicago, Ill. LB **$1,058,116**. Calumet Skyway Toll Bridge, Sec. 5-C-3, paving, concrete deck and bit. binder, drain, wiring frame, Commercial Ave. to near E. 96 St., CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids Jan. 31. CD 1/18.

▲ **Kenny Constr. Co.**, 3220 Oakton St., Skokie, Ill. LB **$1,024,838**. Calumet Skyway Toll Bridge, Sec. 3-B-4, Stony Island interchange between Skyway and Stony Island Ave., CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids Feb. 4. CD 1/17.

Superior Concrete Constr. Co., 5113 Woodlawn Ave., Chicago, Ill. LB **$671,944**. Calumet Skyway Toll Bridge Sec. 3-A-4, paving, appurtenant frame near Dante Ave. to E. 79 St., incl. paving of bridges at E. 79, Stoney Island and E. End Ave., CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids Feb. 1. CD 1/18.

† **E. T. Simonds Constr. Co.**, Carbondale, Ill., and **J. D. Barter Constr. Co.**, Harrisburg, Ill., LB **$933,015** exten. Air National Guard Runways at local airport and parking area, SPRINGFIELD, ILL. U. S. Eng., 475 Merchandise Mart, Chicago 54, Ill. Bids Feb. 7.

Mullen Electric Co., Appleton, Wis. LB $83,438. (10 bidders) street lighting system, STEVENS POINT, WIS. City, Stevens Point, Wis. Bids Jan. 30. CD 12/31.

J. A. Marutech, 522 S. Grand Ave., Waukesha, Wis., LB **$98,979**. (2 bidders) storm sewer in Dunbar St. and Maple Ave., WAUKESHA, WIS. City, City Hall, Waukesha, Wis. Bids Feb. 4. W. E. Dick, Waukesha, Wis., city engr.

MICHIGAN—State Hy. Dpt., Stevens T. Mason Bldg., Lansing,

Sugden & Sivier, Inc., 13100 Cloverdale St., Oak Park, Mich. LB **$244,963** est. $270,000. (5 bidders) rein.-con. rigid frame bridge, grading, water mains on Warren Road over Hines Dr., CS B3 of 82-3-20 C1 (S 173 15), Wayne Co. Bids Feb. 6. CD 1/17.

▲ **MICHIGAN**—State Hy. Dpt., Stevens T. Mason Bldg., Lansing,

Cooke Contg. Co., 1116 Penobscot Bldg., Detroit, Mich. LB **$1,586,134** est. $1,830,000. (15 bidders) 12 ft. c. conc. 12 ft. and 36 ft. b. conc., removal and reconditioning sidewalks on 9 grade separations 7.718 mi. Detroit Industrial Expressway US-12 from Telegraph Rd. to Michigan Ave., FAP 1956, I 82022 C3 UN (SP 82-96), etc., Wayne Co. CD 1/24.

BUILDINGS—LB & CA

Riley Constr. Co., Alliance, O. LB **$663,353**. ELEMENTARY SCHOOL, Two SCHOOL addns., LEETONIA, O. Leetonia Bd. Educ., Leetonia, O. Bids Jan. 8. CD 12/13.

Wm. Passalacqua Builders, Inc., 16828 Kinsman Rd., Cleveland 20, O. LB **$386,500**. general constr. CITY HALL, PARMA, O. City, City Hall, 6611 Ridge Rd., Cleveland 29, O. Bids Jan. 5. CD 8/7.

▲ **Gust K. Newberg Constr. Co.**, 2040 N. Ashland Ave., Chicago, Ill. CA **$47,000,000**. Electric POWER PLANT, grading, railroad tracks, near NEW ALBANY, IND. Public Service Co. of Indiana, 1100 Main St., Plainfield, Ind. Bids Dec. 3. CD 11/30.

Abell-Howe Co., 53 W. Jackson Blvd., Chicago, Ill. CA **$275,000**. 2 story, brick testing LABORATORY and OFFICE, Clinton and Cabrini Sts., CHICAGO, ILL. R. W. Hunt Co., 175 W. Jackson Blvd., Chicago, Ill.

Ragnar Benson, 4744 W. Rice St., Chicago, Ill. CA **$485,900**. GARAGE, 1110 N. Kolmar St., CHICAGO, ILL. Motorola, Inc., 1110 E. Kolmar St., Chicago, Ill. A. E. Benson, 332 S. Michigan Ave., Chicago, Ill., archt.

Conray Constr. Co., 7850 S. Wood St., Chicago, Ill. LB **$463,852**. Adlai E. Stevenson Elementary SCHOOL addn., 8010 S. Kostner Ave., CHICAGO, ILL. Bd. Educ., 228 N. LaSalle St., Chicago, Ill. CD 12/1/55.

▲ **Carl Erickson**, 4657 N. Ravenswood Ave., Chicago, Ill. CA **$1,200,000**. APARTMENT, 247 E. Delaware St., CHICAGO, ILL. LaSalle National Bank, 135 S. LaSalle St Chicago, Ill. Hirschfeld & Pawlson, 327 S. LaSalle St., Chicago, Ill., archts.

B. W. Handler Co., 223 W. Jackson Blvd., Chicago, Ill. CA **$750,000**. 2 story, bsmnt., brick SYNAGOGUE, 16 S. Clark St., CHICAGO, ILL. Chicago Loop Orthodox Synagogue, 33 N. LaSalle St., Chicago, Ill. Bids Jan. 2. CD 12/12.

▲ **A. L. Jackson Co.**, 300 W. Washington St., Chicago, Ill., CA **$1,700,000**, ADMINISTRATION BLDG. and Blackstone HALL addns., CHICAGO, ILL. Art Institute of Chicago, S. Michigan and E. Adams Sts., Chicago, Ill. CD 2/4, under LB.

Fred W. Skirrow & Co., Washington Blvd., Chicago, Ill. CA **$500,000**. 3 story, brick FACTORY addn., CHICAGO, ILL. Kay Musical Instrument Co., 1638 W. Walnut St., Chicago, Ill. Fridstein Eng. Co., 228 N. LaSalle St., Chicago, Ill., engr.

J. C. Harris & Sons, Inc., 5400 N. Elston Ave., Chicago, Ill. CA **$250,000**. 2 story, brick WAREHOUSE and OFFICE, 4501 James Pl., MELROSE PARK, ILL. Carpenters Steel Co., 1516 W. Carroll St., Chicago, Ill. Clarence L. Dahlquist & Assocs., 1625 Glenview Rd., Glenview, Ill., archts.

G. W. Lindstrom, 2155 Farrell Ave., Park Ridge, Ill. CA **$375,000**. APARTMENT 24 units, 1445 Touhy Ave., PARK RIDGE, ILL. James W. Salvatore, 826 Touhy Ave., Park Ridge, Ill. Reuben H. Johnson, 1445 W. Farragut St., Chicago, Ill., archt.

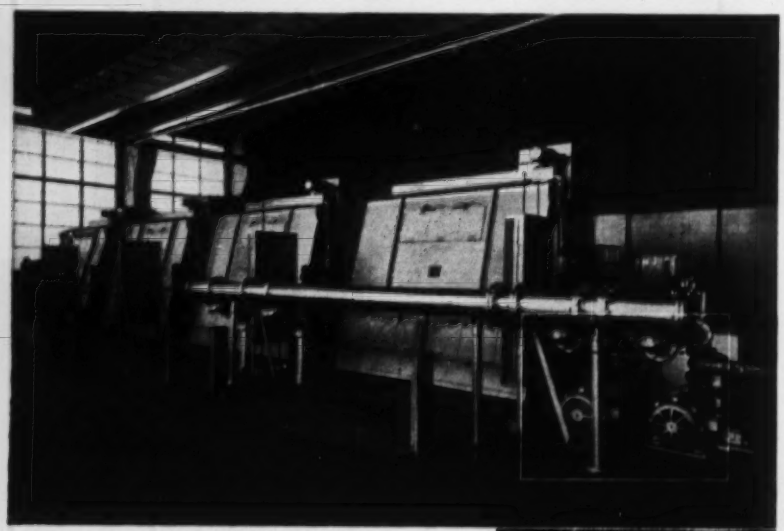
J. P. Jansen Co., 5376 N. Teutonia Ave., Milwaukee, Wis., CA **$100,000**. 1 story, 35x39 ft. and 50x89 ft. WAREHOUSE and OFFICE, MILWAUKEE WIS. H. A. Morton, 8263 N. Grey Log Lane, Milwaukee 17, Wis. R. E. Rasche, 601 W. Capitol Dt., Milwaukee, Wis., archt.

Peters Constr. Co., 2640 N. Humboldt Ave., Milwaukee, Wis., CA Est. **$100,000**. 1 story, 60x330 ft. WAREHOUSE, MILWAUKEE, WIS. Fullerton Steel & Wire Co., 3400 S. Hansen Ave., Milwaukee, Wis. P. A. Zahorizk, 735 N. Water St., Milwaukee, Wis., engr.

T. S. Willis, 20 E. Milwaukee St., Janesville, Wis., CA **$819,900** general contract, HIGH SCHOOL addn., alterations, WEST BEND, WIS. School Dist. 1, West Bend, Wis. Bids Nov. 7. CD 11/13, under LB.

Scherrer Constr. Co., New Munster, Wis., LB **$171,620** (6 bidders) 1 story, 140x200 ft. specialty

(Continued on page 264)



General view of screen room at Hyperion with Type S Screens at left and Disintegrators at right.

Screenings Handling Made Easy at Los Angeles Hyperion...

Closeup of Disintegrators. Units were added to existing screening installation without expensive structural alterations.

The modern combination of Dorrco Bar Screen — Dorrco Sulzer Disintegrator is paying real dividends at Los Angeles' mammoth Hyperion Treatment Plant. The initial Disintegrator was installed late in 1953 to operate in "closed-circuit" with four Type S Bar Screens. For approximately eighteen months this one unit ground all screenings from an average flow of 249 MGD! A second unit has since been installed to serve as standby.

Essentially a low-lift, axial flow pump, the Disintegrator produces a mealy product which is returned to the plant flow without affecting subsequent treatment steps. A portion of Disintegrator discharge is used to flush screenings into the grinder. Wear results at Hyperion have been excellent and periodic inspection and blade replacement have held maintenance costs to a minimum.

If you'd like more information on this modern answer to the screenings handling problem, write for a copy of Bulletin No. 6400. Dorr-Oliver Incorporated, Stamford, Connecticut.

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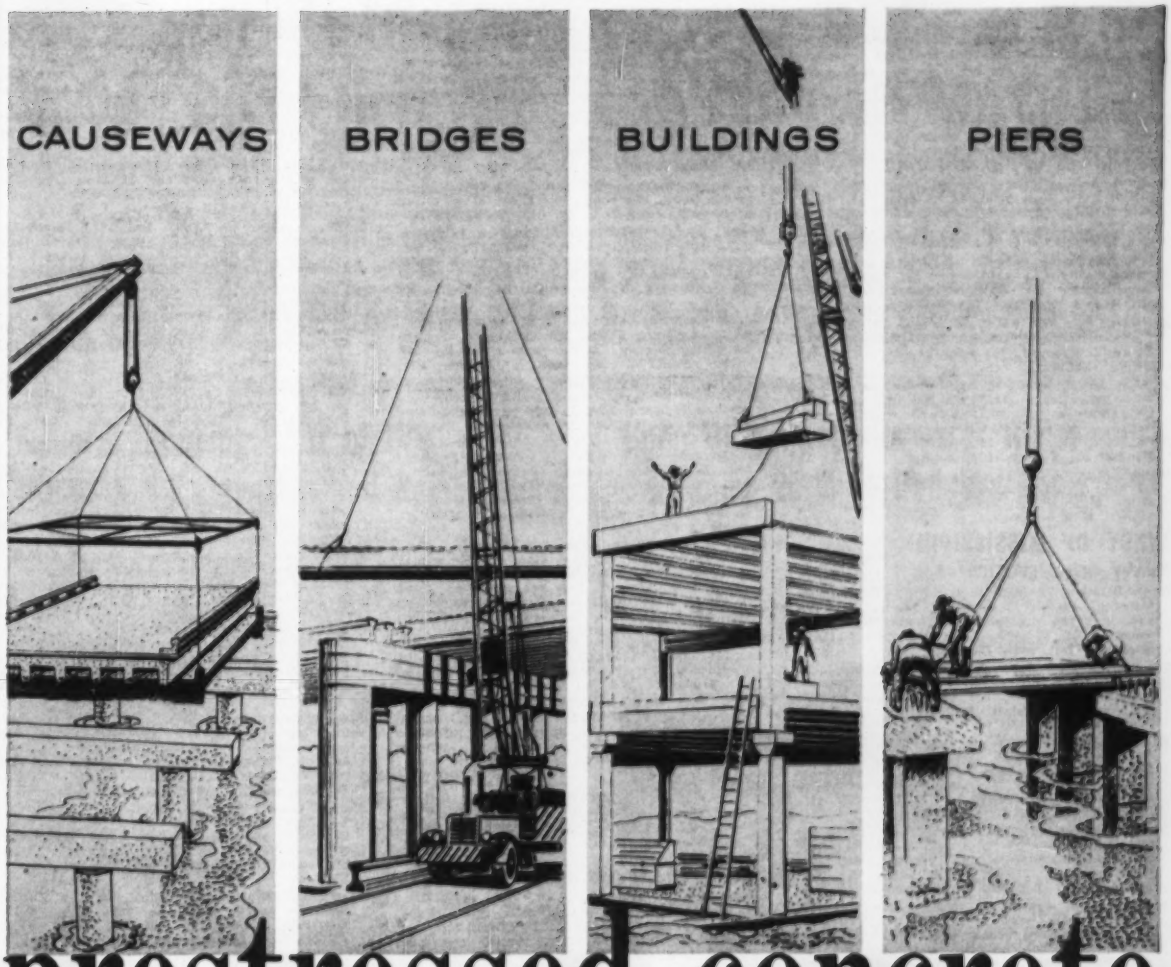

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Economy Cast Stone Co.
15 East Franklin St.
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Empire Prestressed Concrete of Oregon
9255 N. E. Halsey Street
Portland, Oregon

Goodstone Mfg. Co. Inc.
470 Hollenbeck Street
Rochester, N. Y.

F. Hurlbut Co.
Green Bay
Wisconsin

Lewis Mfg. Co. Inc.
3044 S. W. 28th Lane
Miami, Florida

New England Concrete Pipe Corp.
99 Needham Street
Newton Upper Falls 64, Mass.

Mid-South Concrete Pipe Co.
1977 Chelsea Avenue
Memphis, Tennessee

Formigli Corporation
2050 Locust Street
Philadelphia, Pa.

J. A. Park Machinery Co.
P. O. Box 1532
Pueblo, Colorado

Precrete, Inc.
130-01 Northern Blvd.
Corona, N. Y.

Southwest Prestress Co.
P. O. Box 5602
Dallas, Texas

Ready-to-Pour Concrete Co.
P. O. Box 1075
Idaho Falls, Idaho

Arnold Stone Co. Inc.
P. O. Box 3346
Greensboro, North Carolina

(Continued from page 262)
PRINTING PLANT, WHITEWATER, WIS. Whitewater Industrial Development Corp., 141 Main St., Whitewater, Wis. Bids Jan. 24 CD 1/2.

Highland Building Co., 139 W. Maple St., Birmingham, Mich. Owner Builds. **$625,000.** West Bloomfield Park subdivision, 20 brick HOMES, BLOOMFIELD, MICH.

George Datema & Sons, 1560 Taylor St., Grand Rapids, Mich. CA **$424,789.** general constr. HOSPITAL, HASTINGS, MICH. Bd. Supervs. Barry Co., County Bldg., Hastings, Mich. CD 1/24, under LB.

Smith & Andrews Constr. Co., 21110 Greenfield St., Oak Park, Mich. CA **$846,944.** (9 bidders) Lamphere JUNIOR HIGH SCHOOL, MADISON HEIGHTS, MICH. Bd. Educ., Lamphere School Dist. No. 4, F. W. Miller, secy, 621 Katherine St., Madison Heights, Mich. Bids Jan. 28. CD 1/11.

Fullerton Home Builders, 19156 Filer St., Detroit, Mich. Owner Builds. **$540,000.** 60 HOMES PARK, Court and Maureen Sts., MADISON HEIGHTS, MICH.

▲ **Thiele Constr. Co.,** 24145 Little Mack St., St. Clair Shores, Mich. Owner Builds. **$3,200,000.** St. Clair Estates Development, 125 brick HOMES, ST. CLAIR SHORES, MICH.

▲ **Atlas Industries,** Mound and 8-Mile Rds., Warren, Mich. Owner Builds. Est. **$1,000,000.** Baseline OFFICE CENTER (Industrial), four wings with connecting walkways, parking facilities, Eight Mile Rd. and Mound Rd., WARREN, MICH. Paul H. Johnson, Inc., 25014 Plymouth St., Redford, Mich., archt.

Walter L. Couse & Co., 12740 Lyndon St., Detroit, Mich. CA Est. **$500,000.** Central OFFICE, WYANDOTTE, MICH. Michigan Bell Telephone Co., 365 Cass St., Detroit, Mich. Bids Jan. 17. CD 1/10.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

North Dakota — TRANSMISSION LINE — BA 2/28 — Mountrail Electric Co-operative, Stanley, transmission line, two sub-stations, one switching station, Mountrail Co. $80,000, Ulteig Eng. Corp., 1114½ Main St., Fargo, engrs. CD 12/6.

Tex., Abilene—BA 2/28—City, c/o A. Haneman, Jr., acting city mgr., sewerage sys. imprvs., pumping station and sewage treatment plant, $500,000. Plans deposit $40. Freese & Nichols, 407 Danciger Bldg., Fort Worth, Tex., engrs. CD 10/24.

Iowa, Clare—BA 3/4—Town, water distr. sys., incl. 7,800 lin. ft. 4 and 6 in. asbestos cement pipe, 11 fire hydrants, valves, boxes, etc., vertical turbine well pump 30 gpm water, lubricated 1,500 gal. pressure tank, controls and accessories. Plans deposit $15. Rowatt-Murray, Engineers, Belmond, engrs.

Iowa, Lake City—SWIMMING POOL—BA 3/5—City, City Hall, 35x60x105 ft. fan shaped swimming pool complete with wading pool, deck, fence, bathhouse and filter equipment. $75,000. Plans deposit $15. Rowatt & Murray, Engineers, Belmond, engrs.

† **Missouri**—BA 3/6—U. S. Eng., P. O. Box 867, Little Rock, Ark., relocation of State Hy. 86 from Hy. 13 to Stone-Barry County Line, relocating approx. 10 mi. hy., incl. concrete substructures for Big and Little Indian Creek Bridges, one 6x10 ft. concrete box culvert, one double 10x12 ft. concrete box culvert, Table Rock Reervoir, Stone Co., White River, CIVENG-03-050-57-46. $500,000-$1,000,000. CD 7 /16/54.

† **Colo., Denver**—BA 3/7—Atomic Energy Comn., P. O. Box 2611, Denver, sewage disposal sys. (addns.) 292-57-33, $85,000.

† **Missouri**—BA 3/7—U. S. Eng., P. O. Box 867, Little Rock, Ark., relocating State Hy. P at Roaring River, relocation approx. 1.43 mi. hy., incl. concrete, steel bridge over Roaring River, Table Rock Reservoir, Barry Co., White River, CIVENG-03-05-57-43, $100,000-$500,000. CD 7/16/54.

† **N. D., Grand Forks**—BA 3/7—U. S. Eng., 1709 Jackson St., Omaha, Neb., airfield paving, Grand Forks Air Force Base, Inv. 25-066-57-49. CD 8/22.

† **N. D., Valley City**—GAP FILLER FACILITY—BA 3/7—U. S. Eng., 1709 Jackson St., Omaha, Neb., gap filler facilities, Inv. 25-066-57-37.

▲† **Tex., San Antonio**—ACADEMIC, etc.—BA 3/8—U. S. Eng., Box 1229, Galveston, academic (school) bldg. at Aeromedical Center, and flight medicine laboratory. Brooks Field. $3,000,000. Extended date. CD 2/5.

Minn., Olivia—BA 3/11—Village, M. S. Nelson, clk., water treatment plant, 880 lin. ft. c. i. pipe, $80,000. Plans deposit $25, G. M. Orr Eng. Co., 1104 Currie Ave., Minneapolis, Zone 3, engr.

† **South Dakota**—BA 3/12—U. S. Eng., 1709 Jackson St., Omaha, Neb., power house roads and power house parking areas, Gavins Point Reservoir proj., Yankton, Inv. 25-066-57-70.

† **Mont., Great Falls**—HEADQUARTERS AND OPERATIONS BLDG.—BA 3/13—U. S. Eng., City-County Airport, Walla Walla, Wash., 13,000 sq. ft. masonry squadron headquarters and operations bldg., with appurtenant utilities, paving, Malmstrom Air Force Base, ENG-45-164-57-24. CD 8/24.

† **New Mexico**—A C & W FACILITIES—BA About 3/19—U. S. Eng., P. O. Box 1538, Albuquerque, A C & W facilities, Las Cruces Air Force Station, Continental Divide Air Force Station, and Moriarty Air Force Station, ENG-29-005-57-78.

† **Wyoming**—BA 3/27—Bureau Reclamation, Dpt. Interior, Glendo, earthwork, structures, surf. access road and county road relocation for Glendo Dam and Reservoir, Missouri River Basin Proj., near Glendo, Spec. DC 4852; adv. ENR 2/21. CD 5/25/44.

BUILDINGS—BA

Kan., Mission—SCHOOL—BA 2/26—Diocese of Kansas, 1228 Sandusky St., Kansas City, Kan., Bishop Meige High School, for St Agnes Parish, 5041 Reinhardt Dr. $980,000. Extended date. Shaughnessy, Bower & Grimaldi, 3543 Broadway, Kansas City, Mo., archts. CD 1/29.

▲ **Kan., Altamont**—SCHOOL—BA 2/28—Bd. Educ., high school to gymnasium and auditorium. $1,400,000. Frangkiser & Hutchens, 7926 State Line, Kansas City, Mo., archts. CD 5/25.

† **N. M., Albuquerque**—WAREHOUSE—BA 2/28—Atomic Energy Comn., Box 5400, 35,000 sq. ft. warehouse, Sandia Base, Inv. 2-92-57-34. $265,000-$290,000.

▲ **Kan., Fort Leavenworth**—HOUSING—BA 3/1—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., construct and finance 200 housing units, (Capehart), ENG-23-028-57-55. $1,300,000. Neville, Sharp & Simon, 25 E. 12 St., Kansas City, Mo., archts. CD 1/30.

Kan., Williamsburg—SCHOOL—BA 3/1—Joint High School Dist. 6 and Joint Common School Dist. 51, Franklin and Osage Counties, Williamsburg, grade and high school. $500,000. Williamson & Loebsack, 1245 Topeka Bldg., Topeka, archts.

Tex., Austin—WARD, etc.—BA 3/5—Bd. for Texas State Hospitals & Special Schools, 4405 Lamar Blvd., ward bldg. and utility bldg. for Austin State Hospital. $850,000. CD 1/8.

Tex., Houston — CLUB — BA 3/5 — Houston Engineers' Club, 2615 Fannin St., club bldg. addns., alterations. $350,000. Plans deposit $25. Wilson, Morris & Crain, 3330 Graustark St., archts. H. E. Bovay, Jr., 5009 Caroline St., and Walter P. Moore, 2 Pinedale St., consult. engrs.

Minn., Brainard—OFFICE—BA 3/8—State Hy. Dpt., 1246 University Ave., St. Paul, 49x65 ft. office, 81x161 ft. heated truck storage bldg., 42x161 ft. unheated storage bldg., 53x65 ft. sign and paint shop, 41x60 ft. shop addn. for constr. Dist. No. 3 and Maintenance Dist. No. 4. $390,000. Plans deposit $50. Stegner-Hendrickson, Brainerd, archts. CD 7/26.

Minn., Tyler—HOSPITAL—BA 3/12—Village, Tyler Municipal Hospital. $440,000. Plans deposit $35. Fasth, Hillstrom & Horty, 910 Midland Bank Bldg., Minneapolis, archts. CD 9/6.

▲ **Tex., Fort Worth**—APARTMENT—BA 2/22—Southwestern Baptist Seminary, Seminary Dr., sixteen 2 story 5,300 sq. ft. each, apartment bldgs, Seminary Dr. $1,000,000. Plans deposit $25. Williams & Reeves, 3327 Winthrop Dr., archts.

BUILDINGS—SLC

▲ **Tex., Fort Worth**—APARTMENT—Southwestern Baptist Seminary, Seminary Dr., soon lets contract sixteen 2 story, 5,300 sq. ft. each, apartment bldgs., Seminary Dr. $1,000,000. Williams & Reeves, 3327 Winthrop Dr., archts.

HEAVY CONSTRUCTION—LB & CA

IOWA—State Hy. Comn., Ames,

Iowa—R. M. Wilson, Guttenberg, Iowa. LB **$129,808.** bridges, culverts, Proj. S 128 (1), Clayton Co.;

Iowa—Jensen Constr. Co. 1901 Easton Blvd., Des Moines, Iowa. LB **$168,762.** Group 2 bridge, Proj. S 267 (5), Polk Co. Bids Feb. 5. CD 1/24.

▲ **IOWA**—State Hy. Comn., Ames.

Iowa—E. M. Duesenberg, Inc., Mason City, Iowa. LB $91,002. c. conc. 2.985 mi. Proj. S 854 (6), Greene Co.;

Iowa—Booth & Olson, Inc., 529 Insurance Exchange Bldg., Sioux City, Iowa. LB **$143,390.** c. conc. 1.189 mi. Proj. FN-63 W, Lucas Co.; LB **$252,729.** c. conc. 3.895 mi. Proj. F 38 (14), Plymouth Co.; LB **$215,256.** c. conc. wid'n. 10.493 mi. Proj. F 57 (7), Henry Co.;

Iowa—Green Constr. Co., 321 Locust St., Des Moines, Iowa. LB **$181,442.** c. conc. wid'n. 9.324 mi. Proj. F 154 (5), Carroll Co.; LB **$226,373.** c. conc. wid'n. 14.424 mi., Proj. F 1047 (1), Worth Co.;

Iowa — Kaser Constr. Co., 311 Ingersoll St., Des Moines, Iowa. LB **$478,794.** c. conc. wid'n., b. conc. resurf. 11.816 mi. Proj. F 52 (5), Audubon Co.; LB **$228,413.** b. conc. 8.117 mi. Proj. S 1805 (2), Jasper Co.; LB **$188,636.** b. conc. resurf. 12.122 mi. Proj. F 370 (3), Calhoun Co.; LB **$193,601.** b. conc. resurf. 12.36 mi. Proj. F 475 (6), Webster Co.; LB **$303,625.** b. conc. wid'n., b. conc. resurf. 7.285 mi. Proj. F 314 (2), Cass Co.;

Iowa—Mauer Constr. Co., Sac City, Iowa. LB **$122,697.** b. conc. 6.06 mi. Proj. S 204 (4), Buena Vista Co.; LB **$164,522.** b. conc. 6.966 mi. Proj. S 1031 (2), O'Brien Co.; LB **$184,509.** b. conc. 7.989 mi. Proj. S 211 (5), Sioux Co.; LB **$163,579.** b. conc. 6.981 mi. Proj. S 214 (5), Sioux Co.; LB **$213,970.** b. conc. 6.464 mi. Proj. 254 (3), Woodbury Co.;

Iowa—Iowa Road Building Co., Fairmont, Minn. LB **$81,959.** b. conc. 1.023 mi. Proj. F 1046 (1), Polk Co.;

Iowa—E. C. Henningsen, Atlantic, Iowa. LB **$110,964.** b. conc. 2.983 mi. Proj. S 1083 (4), Union Co.;

Iowa—Hargrave Constr. Co., 2424 Bever St. S. E., Cedar Rapids, Iowa. LB **$189,589.** b. conc. resurf. 7.075 mi. Proj. F 301 (3), Des Moines Co.; LB **$160,224.** b. conc. resurf. 7.725 mi. Proj. F 299 (4), Louisa Co. Bids Feb. 5. CD 1/24.

† **Geo. Bennett Constr. Co.,** 330 N. 91 St., Kansas City, Kan. CA **$891,926.** embankment channel excav. of access roads on Pomme de Terre River, near Hermitage, Hickory, ENG-57-25, MISSOURI. U. S. Eng., 1800 Federal Office Bldg., Kansas City, Mo. CD 11/20, under CA.

† **Ottinger Constr. Co.,** 6100 Camp Bowie Blvd., Fort Worth, Tex. LB **$186,392.** Schedules A, B and C, superstructures for Kings River, Big Indian Creek and Little Indian Creek Bridges, 22 ft. concrete roads and steel beam superstructure for each bridge, Table Rock Reservoir, State Hy. 86, CIVENG-03-050-557-35, MISSOURI. U. S. Eng., P.O. Box 867, Little Rock, Ark. Bids Feb. 6. CD 1/14.

† **Clarkson Constr. Co.,** 4133 Gardner St., Kansas City, Mo. CA **$744,870,** est. $792,020. North-South Runway extension, Grandview Air Force Base, ENG-57-43, GRANDVIEW, MO. U. S. Eng., Federal Office Bldg., Kansas City, Mo. Bids Jan. 23, awarded Feb. 1. CD 1/28, under LB.

† **U. S. Eng.,** P.O. Box 867, Little Rock, Ark., cancelled bids to have been opened Feb. 15, dual access road, Little Rock Air Force Base, ENG-03-05-57-4, JACKSONVILLE, ARK. Will-re-advertise. CD 1/23.

† **Wm. S. James Jr. Constr. Co.,** 1323 Spruce St., Texarkana, Tex. LB **$168,837,** Base Bid addnl. facilities, Texarkana Air Force Base, ENG-34-066-57-22, TEXARKANA, ARK. U. S. Eng., Box 61, Tulsa 2, Okla. Bids Jan. 23. CD 1/10.

† **Sweetman Constr. Co.,** 100 S. Dakota St., Sioux Falls, S. D. LB **$545,816.** (4 bidders) levees and channel alterations, Sec. II, Big Sioux River, Inv. 25-066-57-49, SOUTH DAKOTA. U. S. Eng., 1709 Jackson St., Omaha, Neb. Jan. 31. CD 1/28.

KANSAS—State Hy. Comn., Concordia,

List & Clark Constr. Co., 2W. 40 St., Kansas City 11, Mo. LB **$215,549.** Bridge 9-15-34.4, Proj. 9-15 S 1170 (3) Part I, Cloud Co. Bids Feb. 7. CD 1/23, under Streets and Roads.

Shawnee Constr. Co., 3206 Strong Ave., Kansas City, Kan. LB **$133,545,** est. $325,000. sewerage sys. lines, Shawnee Twp. Sewer Dist. 8, Holliday Dr. Co. to Kaw River, TURNER, KAN. Shawnee Twp., Wyandotte Co., Court House, Kansas City, Kan. Truman Schlup Eng. Co., 1401 Fairfax Trafficway, Kansas City, Kan., engr. Bids Jan. 28. CD 10/16.

† **Prock Constr. Co.,** Independence, Mo. LB **$178,900.** excavation on Eufaula dam site, south of Muskogee on Canadian River, CIVENG-34-066-57-47, OKLAHOMA. U. S. Eng., Box 61, Tulsa 2, Okla. Bids Jan. 30. CD 1/21.

† **Shelton Constr. Co.,** 1309 Gore St., Lawton, Okla. LB **$259,016,** est. $350,000. officers' club, Clinton-Sherman Air Force Base, NBy 1109, Spec. 1109/56, CLINTON, OKLA. Officer in Charge of Constr., 8th Naval Dist., Bldg. 16, U. S. Naval Station, New Orleans (Algiers) La. CD 12/31.

Boecking Constr. Co., 2810 N. McArthur 11, Oklahoma City, Okla. LB **$768,979,** est $776,727. Deep Fork storm sewer from 42nd and Altadena, to Belle Isle Lake, OKLAHOMA CITY, OKLA. City, City Hall, Oklahoma City, Okla. Benham Eng. Co., 215 N.E. 23rd St., Oklahoma City, Okla., engr. CD 1/21.

† **Great Lakes Dredging & Dock Co.,** 2400 Canal St., 88, Port La Vaca, Tex. CA **$937,731.** dredging Brownsville and Port Isabel channels of Brazos Island Harbor, CIVENG-41-243-57-44, TEXAS. U. S. Eng., 606 Santa Fe Bldg., Galveston, Tex. Bids Jan. 31. CD 1/30.

Vaughn & Taylor, Box 2624, Odessa, Tex. LB **$86,543.** water and sanitary sewer lines, ABILENE, TEX. City, City Hall, Abilene, Tex. Cleo Whitlock, Box 60, Abilene, Tex., city engr. CD 1/21.

E. H. Reeder Constr. Co., 2128 Hawes St., Dallas, Tex. CA **$649,922,** est. $645,000. constr. Southwest 48-in. water feeder main, FORT WORTH, TEX. City, c/o Dr. Jack Garrison, mayor, Fort Worth Tex. Freese & Nichols, 407 Danciger Bldg., Fort Worth, Tex., engrs. CD 2/7, under LB.

Concho Constr. Co., P.O. Box 6046, Dallas, Tex. LB **$178,509,** est. $180,000. constr. Felix St. connection overpass, FORT WORTH, TEX. City, c/o Dr. Jack Garrison, mayor, C. M. Thelin, Fort Worth, Tex., dir. Public Wks. CD 1/23.

John G. Holland Constr. Co., 1602 Old Spanish Trail, Houston, Tex. LB **$211,555,** est. $220,000. storm sewers, Nettleton-Dowling Sts., HOUSTON, TEX. City, City Hall, Houston, Tex. Bids Jan. 29. CD 1/23.

† **Heidenfels Brothers,** Box 1917, Corpus Christi, Tex. LB **$93,000.** repair pavement at Naval Auxiliary Air Station, KINGSVILLE, TEX. Bureau Yards & Docks, Dpt. Navy, Naval Air Station, Corpus Christi, Tex. CD 9/29/55.

J. R. Fannin, Box 1278, Municipal Airport, Lubbock, Tex. LB **$231,592,** est. $290,000. N-S Runway extension for Turbo-Prop. Jet Planes, etc., LUBBOCK, TEX. City, City Hall, Lubbock, Tex. Bids Jan. 29. Parkhill, Smith & Cooper, 2001 Ave. R at Clovis Road, Lubbock, Tex., engrs. CD 2/4.

▲† **E. V. Lane Corp.,** Palo Alto, Calif. LB **$2,794,115.** (3 bidders) altering control shaft, construct foundations for second power plant, rehabilitate 14 mi. railway track at Fort Peck Dam, Valley Co., MONTANA. U. S. Eng., Fort Peck, Mont. Bids Feb. 7. CD 1/31.

† **Northwestern Eng. Co.,** 6001 Colo Blvd., Denver, Colo. LB **$243,423.** (5 bidders) runway extension, Natrona County Airport, Inv. 25-066-57-41, CASPER, WYO. U. S. Eng., 1709 Jackson St., Omaha, Neb. CD 12/21.

COLORADO—State Hy. Dpt., 4201 E. Arkansas St., Denver,

C. L. Hubner, 4200 E. Jewell St., Denver, Colo. CA **$133,191,** plant mix asph. surf. 3.914 mi. S 0015 (11) Kiowa Co. Bids Feb. 5. CD 1/28.

COLORADO—State Hy. Dpt., 4201 E. Arkansas St., Denver,

Corn Constr. Co., Grand Junction, Colo., CA **$105,628,** grading, structures 0.998 mi. State Hy. No. 141, Colo. Proj. A-AA 23 (1), Mesa Co. Bids Feb. 6. CD 1/28.

† **B. H. Baker, Inc.,** Box 173, Colorado Springs, Colo., LB **$161,035,** communications bldg., Air Force Academy, IFB 05-613-57-15, COLORADO SPRINGS, COLO.
(Continued on page 267)

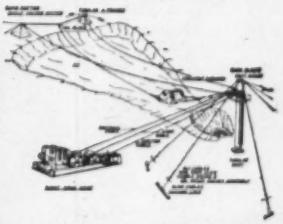
Cut Materials Handling Costs . . . Dig *and Haul* In One Operation With A SAUERMAN MACHINE

Digging and hauling are reduced to one continuous operation by using either a Sauerman DragScraper or Slackline Cableway. By combining the two basic steps of material flow, equipment and labor costs are halved—or even more. A single machine, controlled by one man, does the same job as the multiple equipment required by other methods.

Profitable handling is further assured by a low maintenance cost of 1½ cents per cu. yd. for an average size installation. Larger machines drop this cost still lower. Important, too, is the money saved on power. You pay only the cost of moving the actual digging tool—the Crescent DragScraper or Slackline bucket. Heavy machines with limited handling-to-dead weight capacity are eliminated.

General Handling, Wet or Dry— Pit or Hill Excavation and Reclamation

3-yd. DragScraper digs and hauls sand and gravel from pit to plant hopper over a distance of 400 ft.



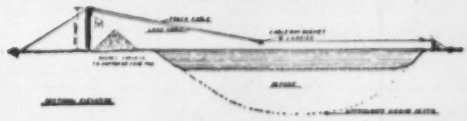
A DragScraper is recommended for these and similar jobs. This machine handles the toughest digging and operates on a hillside or underwater with as much facility as dry level ground. It hauls directly to hopper, crusher or storage pile.

Operation is simple and safe. An inexperienced man can be quickly trained to do the job. Control station and hoist are remotely located from any hazardous area.

Sauerman DragScrapers range in size from ⅓ to 15 yds. They can be worked over spans of 1000 ft.

Crescent approaches hopper in front of tubular mast. Inset shows operator at hoist controls.

Deep Digging, Underwater Recovery— Conveying to High Delivery Point

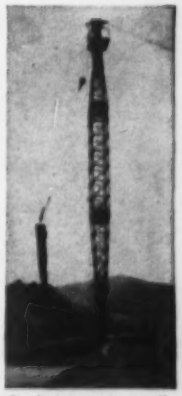


This 1½-yd. Slackline Cableway is digging in 70 ft. of water and conveying to stockpile on an average haul of 600 ft.

When deep digging is required—or anticipated in the future—a Sauerman Slackline Cableway is the best machine. This powerful excavator can dig 100 ft. or more below water, lift its load and deliver to a high pile up to 1000 ft. away. This surge pile can be held in readiness for plant needs.

The bucket inhauls at high speed and dumps automatically. The dumping point is determined by a stop button on the track cable. Gravity returns the bucket to the digging point completing the fast operating cycle.

Sauerman Slackline Cableways range in size from ⅓ to 3½ cu. yds. Now available with torque convertor power, the Slackline is increasing its production over 25%.



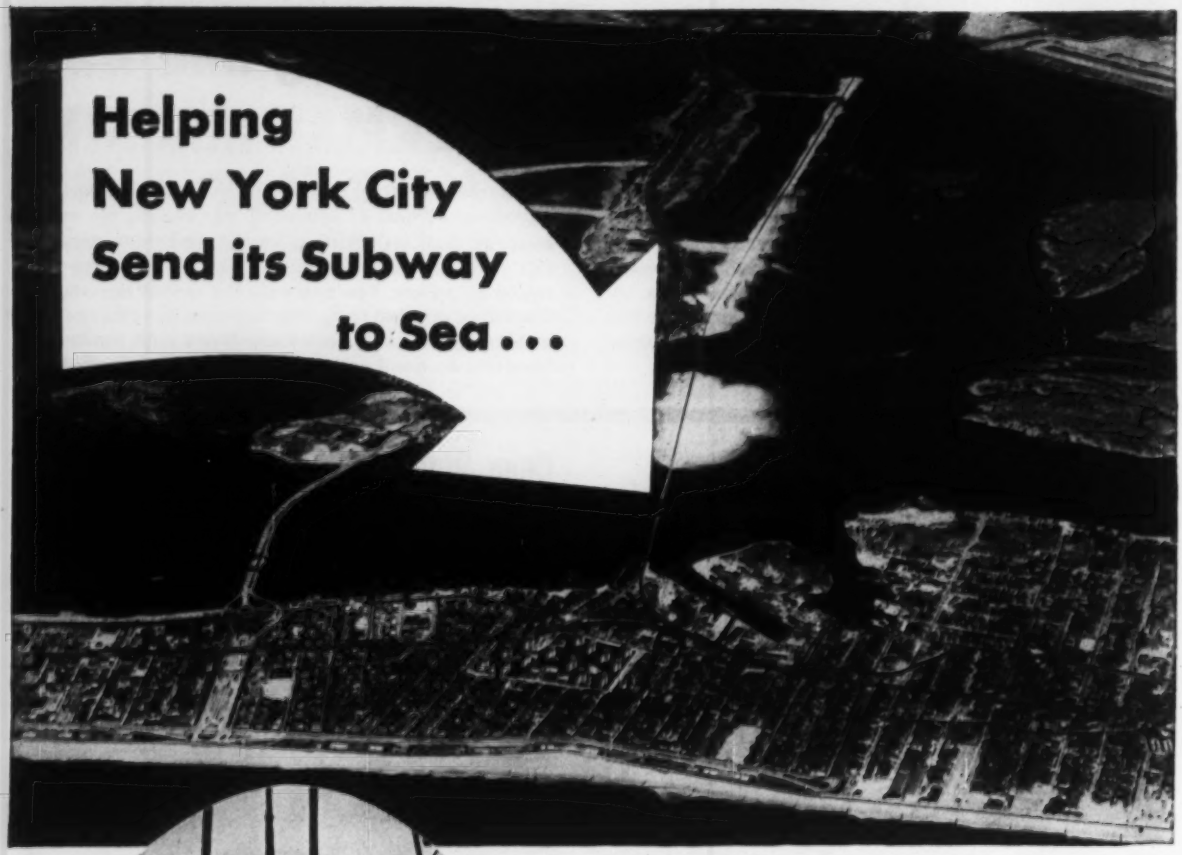
Bucket automatically discharges onto a 60-ft. high cone pile. Mast in foreground rises 90 ft.

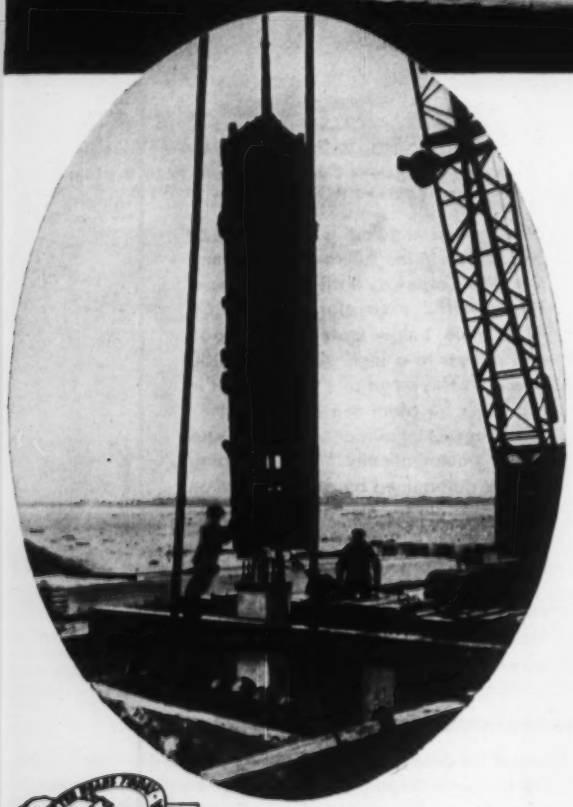
The best Sauerman Machine for your plant is governed by the nature of the deposit, location of material, the depth and plant layout. Why not consult Sauerman engineers about your plant? Their recommendations will be based on almost fifty years of sand and gravel excavating machinery experience. Ask for Catalog A (DragScrapers) and C (Slackline Cableways).

SAUERMAN BROS. INC. 632 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS

CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • SURFLITE BLOCKS

Helping New York City Send its Subway to Sea...





with McKIERNAN-TERRY Pile Hammers

The construction of the 11½-mile extension of New York City's subway system to Rockaway, Long Island, involved building a 4-mile causeway and trestle with bridges over the ship channels in Jamaica Bay.

The concrete trestle rests on bents comprised of 900 precast reinforced concrete piles, 24-in. square with lengths ranging from 40 to 70 ft. For driving the piles, the contractor, Merritt-Chapman & Scott, used a McKiernan-Terry S10 Single-Acting Pile Hammer on a barge crane, as shown in the illustration to the left. A McKiernan-Terry S5 Single-Acting Hammer and a McKiernan-Terry 10B3 Double-Acting Hammer operated from floating rigs were also used to drive 4,100 timber piles for the approach and bridge piers, fender system and cofferdams.

The efficient work of the contractor enabled this project to be completed ahead of time, a record helped by the performance of the McKiernan-Terry Pile Hammers. Write for bulletins describing these effective machines in detail.

McKIERNAN-TERRY CORPORATION
MANUFACTURING ENGINEERS
80 Richards Ave., Dover, N. J. MK395

(Continued from page 264)

Dpt. Air Force, Box 1670, Colorado Springs, Colo. Bids Feb. 5. CD 1/18.

BUILDINGS—LB & CA

J. A. Jones Constr. Co., 354 Aero Dr., Shreveport, La., CA Est. under $1,000,000. General constr. 3 story bsmnt., DEPARTMENT STORE, LITTLE ROCK, ARK. New Development Co., (J. C. Penney Co., lessee) 505 Main St., Little Rock, Ark. Bids Feb. 1, awarded Feb. 5. CD 1/23.

▲ **Borchman & Sons**, 4601 Douglas St., Omaha, Neb. CA $1,730,000. general constr. JUNIOR HIGH SCHOOL 38 and Redick Ave., OMAHA, NEB. Bd. Educ., 3902 Davenport St., Omaha, Neb. CD 1/29, under LB.

▲ **Harmon Constr. Co.**, 100 S. Indiana St., Oklahoma City 3, Okla. LB $1,849,900. 6 story Hillcrest HOSPITAL addn., TULSA, OKLA. Hillcrest Medical Center, 1653 E. 12 St., Tulsa, Okla. Bids Feb. 6. CD 1/17.

Chambers Constr. Co., 1924 Temple Dr., Houston 19, Tex. CA $530,976. 38,000 sq. ft. GYMNASIUM, BEAUMONT, TEX. La Mar State College of Technology, Room 205, Engineering Bldg., Beaumont, Tex. CD 2/1, under LB.

▲ **J. J. Fritch**, 6834 Harry Hines Blvd., Dallas, Tex. LB $2,535,000 Base Bid. PLANT near Richardson, DALLAS, TEX. Texas Instrument, Inc., 6000 Lemmon St., Dallas, Tex. CD 1/28.

Herbert Building Corp., 3730 Cosby St. Owner Builds CA $475,000. 26 DWELLINGS, HOUSTON, TEX. CD 1/2.

LeBlanc, Inc., Box 351, Houston Tex. CA $378,000. frame BELWAY SHOPPING CENTER, HOUSTON, TEX. Southern Realty Co., c/o Irving R. Klein & Assocs., archts. CD 2/11, under LB.

Manhattan Constr. Co., 1811 Crawford St., Houston, Tex. CA $300,000. two PLANT BLDGS., HOUSTON, TEX. Ideal Cement Co., San Jacinto Bldg., Houston, Tex. CD 12/10/56, under LB.

W-M Constr. Corp., 2401 San Jacinto St., Houston, Tex. LB $184,000. (one unit only) MFG. PLANT UNIT, HOUSTON, TEX. A. C. Horn Co. of Texas, Division, 2120 Polk St., Houston, Tex. CD 12/5.

▲ **Warner Constr. Co.**, P.O. Box 769, San Angelo, Tex. CA $1,355,000. general contract, Midland Junior High, North Elementary and West Elementary Schools, MIDLAND, TEX. Midland Independent School Dist., c/o Robert J. Zonne, pres., Midland, Tex. Bids Jan. 5. CD 1/25.

Charles A. Logeman, Box 2255, San Antonio 6, Tex. LB $309,772 Base Bid. GENERAL SERVICE BLDG., SAN ANTONIO, TEX. Southwest Research Institute, 8500 Culebra Rd., SAN ANTONIO, TEX. O'Neil, Ford & Assocs., 528 King Williams St., San Antonio 4, Tex., archts. Beretta, Greenslade & Assoc., Inc., 1927 North St. Marys, San Antonio, Tex., engr. CD 4/24/56.

Cascade Constr. Co., 790 Walnut St., Boulder, Colo., LB $366,666. 2 story, bsmnt., 20,000 sq. ft. CITY HALL, FORT COLLINS, COLO. City, City Hall, Fort Collins, Colo. Bids Jan. 31. William B. Robb, Room 2, Robertson Bldg., Ft. Collins, Colo., engr.

FAR WEST

HEAVY CONSTRUCTION—BA

† **Washington** — SUB-STATION — BA 2/28 — Bonneville Power Admin., 1001 N.E. Lloyd Blvd., Portland, Ore., constr. Snohomish sub-station spur and transfer track extension, foundations and site imprvs., Inv. 8280. Plans deposit $5. CD 2/5/51.

† **Washington**—BA 3/5—Bureau Reclamation, Dpt. Interior, Eparata, earthwork for deep drains Blocks 41, 42 and 43, Columbia Basin Proj., Spec. 117C-420. L. N. McClellan, Bldg. 1A, Denver Federal Center, Denver, Colo., ch. engr. CD 9/10.

CALIFORNIA—BA 3/6—Calif. Div. Highways, 1120 N. St., Sacramento,

Modoc Co.—surfacing 38.4 mi. highways at various locations between Alturas and Oregon State line. $740,000.

Siskiyou Co.—existing roadway widened and surfaced with plant mix at Junction of Rtes. 3 and 46, 8.2 mi. north of Yreka.

Sonoma Co.—about 0.1 mi. graded and surfaced with plant mix over cement treated base near Duncan Mill.

Yolo Co.—channelization and approaches and intersection widened at Co. Road No. 20 about 2 mi. north of Junction of State Rtes. 7 and 50. CD 10/25.

CALIFORNIA—BA 3/7—Calif. Div. Highways, 120 S. Spring St., Los Angeles,

Los Angeles Co.—traffic signal system and highway lighting on Gould Lane in Manhattan Beach, Hermosa Beach and Redondo Beach.

▲† **CALIFORNIA** — BA 3/12 — U. S. Eng., 751 S. Figueroa St., Los Angeles, imprv. Los Angeles River from Owensmouth Ave. to Corbin Ave., CIVENG-04-535-57-30. $4,000,000. CD 1/20/45.

† **Washington**—BA 3/12—U. S. Eng., 4735 E. Marginal Way, Shilshole Bay breakwater, 4,200 ft. long, involving 328,000 tons rock, etc., Inv. 57-46. CD 2/1, under LB.

BUILDINGS—BA

Calif., Long Beach—GYMNASIUM, etc.—BA 3/6—State Div. Architecture, 1120 N St., Sacramento, 1 story, 35,900 sq. ft., rein.-con. men's gymnasium, 1,580 sq. ft. and 4,200 sq. ft. swimming pools, 12,500 sq. ft. concrete pavement. $753,750. Plans deposit $50. CD 6/3/55.

▲ **Calif., Los Angeles**—RESIDENCE HALL—BA 4/2—University of California, 405 Hilgard Ave., Clarence Dykstra Residence Hall. $3,000,000 Plans deposit $300. Extended date. Welton Becket & Assocs., 5637 Wilshire Blvd., archts. CD 1/28.

HEAVY CONSTRUCTION—LB & CA

IDAHO—State Hy. Dpt., Boise,

Carl E. Nelson Constr. Co., Logan, Utah, CA $516,489 roadway, plant mix bit. surf., two 90 ft. concrete bridges 1.264 mi. US 30N Bannock Co. Bids Jan. 22, awarded Jan. 31. CD 1/31, under LB.

▲† **U. S. Eng.**, 1209 Eighth St., Sacramento, Calif. rejected bids Jan. 10, dining hall, heating plant in airmen's dormitories, 2 officers' quarters, Stead Air Force Base, Inv. 2281, RENO, NEV. LB $1,999,955. New Bids About Feb. 11. CD 1/16, under LB.

WASHINGTON—State Hy. Comm., Olympia,

P. J. Anderson & Sons, 13501 Aurora Ave., Seattle 33, Wash. CA $280,232. (9 bidders) clearing, grading, drainage, surf., constr. bridge on 5.038 mi. Primary State Hy. 1, Stimson Rd. to Stillaguamish River, Snohomish Co. Bids Feb. 5. CD 1/15.

▲ **Hydrocarbon Constr. Corp.**, 4604 Main St., Houston, Tex. CA Est. $2,000,000. compressor station with 5 prefab steel bldgs., totaling 10,488 sq. ft., SUMAS, WASH. Pacific Northwest Pipeline Corp., M&M Bldg., Houston, Tex. CD 4/11/52, under Texas, New Mexico, Colorado, Utah, Idaho, and Washington.

† **L. B. Read**, 2607 Sunset Blvd., Portland, Ore., LB $107,682 (4 bidders) Chenoweth sub-station and control house, Wasco Co., OREGON. Bonneville Power Admin., 1001 N. E. Lloyd Blvd., Portland, Ore. Bids Jan. 30. CD 1/10.

† **George S. Smith**, Bothel, Wash., LB $158,153 (4 bidders) Fairview sub-station, Coos Co., Inv. 8261, OREGON, Bonneville Power Admin., 1001 N. E. Lloyd Blvd., Portland, Ore. Bids Feb. 6. CD 1/23.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento,

Guy F. Atkinson Co., 10 West Orange Ave., South San Francisco, Calif. LB $2,695,357, (10 bidders) grading, surf. 4.2 mi. Sign Rte. 20 between U. S. 101 and 0.6 mi. west of Potter Valley Road and 3 structures, bridge and overhead across the Russian River, Undercrossing at Redwood Valley Road and bridge across East Fork of Russian River, Mendocino Co., CALIFORNIA. CD 1/11.

† **CALIFORNIA**—Bureau P. Rds., Dpt. Commerce, 102 Old Mint Bldg., San Francisco,

Baldwin Contracting Co., 8 and Yuba Sts., Marysville Calif., LB $126,781 (17 bidders) timber bridge and grading, Harvey Creek Road Modoc National Forest, Lassen and Modoc Counties.

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If you're interested in bidding on government projects, you'll be glad to know that the Washington Service Bureau of National Surety Corporation issues regular bulletins on just such projects.

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† **CALIFORNIA**—Bureau P. Rds., Dpt. Commerce, 102 Old Mint Bldg., San Francisco, **James H. Clack**, 1288-47th Ave., Sacramento, Calif. LB **$436,022**. (7 bidders) constr. bridge and grading road at Bluff Creek, Six Rivers National Forest, Del Narte and Humboldt Counties.

▲ **CALIFORNIA**—State Dpt. P. Wks., 1120 N St., Sacramento, **Granite Constr. Co.**, P.O. Box 900, Watsonville, Calif., CA **$1,396,039**. grading, paving 2-new lane approx. 7.9 mi. US 101 adjacent to existing traveled way between 1.8 mi. north of Salinas River bridge at King City and 1.2 mi. south of Greenfield, for 4-lane divided freeway, Monterey Co. CD 1/8, under LB.

† **Clarence Ward Constr. Co., Inc.**, P. O. Box 806, Fresno, Calif., LB **$90,224** (3 bidders) modifying Bldg. 1333, CASTLE AIR FORCE BASE, CALIF. Procurement Officer, Castle Air Force Base, Calif. CD 8/23.

Barrett Constr. Co., 1800 Evans Ave., San Francisco, Calif. LB **$477,289** (5 bidders) 18 wood frame horse barns, 4 rest rooms, wood frame, gas and sewer lines, paving, etc., STOCKTON, CALIF. State Div. Architecture, Public Wks. Bldg., 1120 N St., Sacramento, Calif. CD 1/23.

BUILDINGS—LB & CA

Hal. L. Grammer Constr. Co., 3410 E. Flower Rd., Phoenix, Ariz. CA **$612,330**. SCHOOL PLANT Third Ave. and Ocotello, PHOENIX, ARIZ. Madison School Dist., 5601 N 16 St., Phoenix, Ariz. CD 12/7, under LB.

▲ **J. I. Barnes Constr. Co.**, Central Bldg., Seattle 4, Wash., CA **$2,461,868**, 7 story, 71,500 sq. ft. rein.-con. St. Frances Xavier Cabrini HOSPITAL addn., SEATTLE, WASH. Missionary Sisters of the Sacred Heart, c/o J. Graham & Co., archts., 1426 5 Ave., Seattle, Wash. Bids Jan. 17. CD 12/18.

▲ **Sellen & Hansen**, 228 North Ave. N., Seattle, Wash. LB **$1,111,600**. (7 bidders) CITY LIGHT SERVICE CENTER, SEATTLE, WASH. City, Bd. P. Wks., Seattle, Wash. Bids Feb. 6. CD 1/15.

▲† **A. T. Fox**, Box 831, North Bend, Ore. LB **$1,206,880**. (9 bidders) constr. FACILITIES, incl. special services, garage and other bldgs., Spec. 6595/56, COOS HEAD, ORE. Pub. Wks. Officer, 13th Naval Dist., Naval Station, Seattle, Wash. Bids Feb. 6. CD 12/19.

Monson & Sivers, 5000 S.E. 25 Ave., Portland, Ore. CA **$500,000**. WAREHOUSE, PORTLAND, ORE. General Tire & Rubber Co., 1708 Engelwood St., Akron, O. James C. Gardiner, 3158 S.W. 87 Ave., Portland, Ore., archt. Awarded Feb. 5. CD 10/23.

R. C. Fisher, P.O. Box 4081, Fresno, Calif. LB **$551,200** (10 bidders) 1 story, steel frame, concrete floors, Bullard South JUNIOR HIGH SCHOOL, FRESNO, CALIF. Bullard Unified School Dist., c/o Secy., Fresno, Calif. CD 1/23.

Mead & O'Donnell, 7769 Melrose Ave., Los Angeles 46, Calif. LB **$923,572** (8 bidders) Parthenia and Kittridge St. Schools, San Fernando and Van Nuys, LOS ANGELES, CALIF. Los Angeles Bd. Educ., 1425 S. Pedro St., Los Angeles, Calif. Bids Feb. 1, CD 1/25.

Maino Constr. Co., 2238 S. Broad St., San Luis Obispo, Calif. LB **$439,680**. 2 DORMITORIES, COMMUNITY and ADMINISTRATION BLDG. addns. at Paso Robles School for Boys, PASO ROBLES, CALIF. State of Calif., Public Works Bldg., 1120 N. St., Sacramento, Calif. Anson Boyd, c/o owner, state archt. **(Correction—Low Bidder)** CD 2/5 under LB.

Harris Constr. Co., P.O. Box 109, Fresno, Calif., LB **$477,000** (8 bidders) 20,000 sq. ft., 40-bed rein.-con., brick HOSPITAL, PORTERVILLE CALIF. Sierra View Hospital Dist., Porterville, Calif. Bids Jan. 29. CD 2/1.

Robinson & Wilson, P. O. Box 109, San Bernardino, Calif. LB **$670,000**, est. $650,000. 1 story Type 1, concr.-frame Riverside County General Hospital addn., etc. RIVERSIDE, CALIF. Bd. Supervs., Riverside Co. Court House, Riverside, Calif. Bids Jan. 28. CD 1/8.

Barrett Constr. Co., 1800 Evans St., San Francisco, Calif. LB **$652,000** (11 bidders) CRIMINAL-LEGAL BLDG., 2 story, rein.-con. office bldg., 1 story, rein.-con., concrete, brick court room wing, SAN JOSE, CALIF. Santa Clara Co., c/o County Clk., Court House, San Jose, Calif. CD 1/9.

Lindgren & Swinerton, Inc., 1631 W Beverly Blvd., Los Angeles, Calif., CA **$621,289**. 29,500 sq. ft. rein.-con., masonry TELEPHONE BLDG. addn., 4480 Kester Ave., SHERMAN OAKS, CALIF. Pacific Telephone & Telegraph Co., 740 S. Olive St., Los Angeles, Calif. Bernard & Woodford, 410 N. La Brea St., Los Angeles, Calif., archts. Awarded Jan. 29.

Associated Constr. & Eng. Co., 2903 Geneva St., San Francisco, Calif. CA **$200,000**, 22,000 sq. ft. WAREHOUSE and DISTRIBUTION FACILITY for auto mfg. and industrial rubber products. SOUTH SAN FRANCISCO, CALIF. Thermoed Co., c/o contractor.

U. S. Eng., 180 New Montgomery St., San Francisco, Calif., rejected bids design and construct 33 HOUSING UNITS, Proj. No. 8, Capehart Housing, ENG-57-106, TWO ROCK RANCH, CALIF. LB **$543,345**. CD 1/9, under LB.

Lindgren & Swinerton, 1631 W. Beverly Blvd., Los Angeles, Calif., CA **$415,000**. 2 story, 25,517 sq. ft., rein.-con., masonry TELEPHONE BLDG. addn., 1418 North Broad Ave., WILMINGTON, CALIF., Pacific Telephone & Telegraph Co., 740 S. Olive St., Los Angeles, Calif., Barnard & Woodford, 410 N. La Brea Ave., Los Angeles, Calif., archts. Bids Jan. 16, awarded Jan.. 29.

CANADA

HEAVY CONSTRUCTION—BA

ONTARIO—BA 2/27—Dpt. Hys., Parliament Bldgs., Toronto, **Shequiandah**—Contract 56-187, grading, culverts, gran. base, arch culvert 6.6 mi. Hy. 68, Shequiandah to Ten Mile Point. Over $75,000. CD 12/8/50.

Alta., Penhold—RUNWAY, etc.—BA 2/28—Defence Construction (1951) Ltd., 56 Lyon St., Ottawa, Ont., repairs to runway, taxistrip, parking apron and drainage at Royal Canadian Air Force Station. $75,000.

ALBERTA—BA 3/5—Dpt. Pub. Wks., Hunter Bldg., Ottawa, Ont., **Banff**—grading, culverts, base course, Mile 34 to Mile 40, Banff-Jasper Hy., Banff National Park. $75,000. CD 12/1/43.

Ontario—BA 3/5—Hydro-Electric Power Comm. of Ontario, 620 University Ave., Toronto, grade separation on Canadian National Ry. relocation nd Hy. 31 near Cornwall with bridge deck to be erected by others, St. Lawrence Seaway, Cornwall. Wm. Hogg, c/o owner, Field Office, Cornwall, Ont., field engr.; adv. ENR 12/21.

† **Ontario**—BA 3/19—St. Lawrence Seaway Auth., No. 2 Temporary Bldg., Ottawa, supplying installing electrical system at Iroquois Lock, International Rapids Section of the Seaway near Iroquois. A. G. Murphy, c/o owner, 685 Cathcart St., Montreal, Que., ch. engr.

BUILDINGS—BA

Ont., Oshawa—PLANT—BA 2/22—Thomson Newspapers Ltd., c/o Barnett & Reider, archts., 96 Eglington Ave. E., Toronto, newspaper plant exten., 3 story, bsmnt. 45x100x100 ft. on two sides of existing structure, steel masonry and curtain wall construction, extensive alterations to present concrete structure. $350,000.

▲ **Que., Montreal**—STORE—BA 2/26—T. Eaton Co. Ltd. of Montreal, 677 St. Catherine St. W., 10 story, rein.-con. steel, store exten. $5,000,000. Grattan D. Thompson, 1241 Guy St., archt. Wiggs, Walford, Frost & Lindsay, 4350 Sherbrook St., engrs. CD 9/12/55.

Ont., Oshawa—HIGH SCHOOL—BA 3/11—Oshawa Bd. Educ., 179 Simcoe St. E., 2 story, part bsmnt., 240x175 ft., 16-classroom brick, steel high school, concrete fdn. $950,000. John B. Parkin Associates, 1500 Don Mills Rd., Postal Station, Toronto, archts. CD 1/25.

BUILDINGS—SLC

Que., Montreal—PLANT, etc.—Canadian Comstock Co. Ltd., 2531 Walkley Ave., soon lets contract, 1 story, bsmnt., 17,000 sq. ft., rein.-con., steel plant and office, Cote de Liesse Rd. $115,000. Langston & Mathias, 1375 Greene Ave., archts.

Ont., Pembroke—FACTORY, etc.—Eddy Match Co. Ltd., 1270 Pembroke St. W., soon lets contract, factory and warehouse. $500,000. CD 12/7.

HEAVY CONSTRUCTION—LB & CA

Farmer Constr. Co. Ltd., Victoria, B. C., LB **$156,444** (4 bidders) reconstr. Point Ellice Bridge, except structural steel superstructure, VICTORIA, B. C. City, City Hall, Victoria, B. C. Bids Jan. 24. CD 1/4.

ONTARIO—Dpt. Hys., Parliament Bldgs., Toronto, **Cameron & Phin**, Water St., P. O. Box 95, Welland, Ont. CA **$120,999**. 3 bridges Queen Elizabeth Way, 1.8 mi. west of intersection of Queen Elizabeth Way and Hy. 25. Contr. 56-222, Nelson Twp. Awarded Feb. 1.

ONTARIO—Dpt. Hys., Parliament Bldgs., Toronto, **M. J. Labelle Co. Ltd.**, P. O. Box 629, Cochrane, Ont. LB **$265,570** (6 bidders) Contract 56-223, gran. base course and shouldering 12 mi. Hy. 11 from Hearst westerly. Bids Feb. 6. CD 1/23.

ONTARIO—Dpt. Hys., Parliament Bldgs., Toronto, **Sir Landsay Parkinson (Canada) Ltd.**, 52 St. Clair Ave. E., Toronto, Ont., LB **$129,687** (6 bidders) Contract 56-220, structure Hy. 401, Edward St. ¾ mi. north of Prescott.

▲ **Canadian Dredge & Dock Co. Ltd.**, 60 Harbor St. Toronto, Ont., LB **$3,245,450** (2 bidders) dredging approaches at Iroquois Lock in International Rapids Section of Seaway near Iroquois, ONTARIO St. Lawrence Seaway Auth., No. 2 Temporary Bldg., Ottawa, Ont. Bids Feb. 5. CD 1/14.

▲ **Beaver Constr. Co. Ltd.**, 6825 Clanranald Ave., Montreal, Que., LB **$1,084,896** (6 bidders) 10,000 lin. ft. 24- to 54-in. concrete intercepting sewer at harbor front, incl. 2,400 lin. ft. concrete section in rock and 1,750 lin. ft. concrete section in steel liner plated in earth and rock, KINGSTON, ONT. City, City Hall, Kingston, Ont. Bids Feb. 1. CD 1/10.

BUILDINGS—LB & CA

M. Sullivan & Son Ltd., 234 Elgin St., Arnprior, Ont. CA Est. **$200,000**. steel, concrete block 25,000 sq. ft. PLANT, 5,000 sq. ft. OFFICE, Carling Ave., OTTAWA, ONT. Vail's Clean-O-Mat Service, 386 Wellington St., Ottawa, Ont. Balharrie, Helmer & Morin, 77 Metcalfe St., Ottawa, Ont., archts. Awarded Jan. 31. CD 4/14/47.

▲ **Perini, Ltd.**, 248 Albert St., Ottawa, Ont. LB **$2,564,000**. (7 bidders.) 8 story, 60x240 ft., 50x110 ft., steel CITY HALL, Green Island, OTTAWA, ONT. City, N. R. Ogilvie, city clk., 48 Rideau St., Ottawa, Ont. deStein & McCutcheon, 4147 Sherbrooke St. W., Montreal, Que., engrs. Bids Jan. 31. CD 12/28.

T. L. Smith Constr. Co. Ltd., RR 3 (Box 134) Kingston, Ont., CA **$775,000**. HIGH SCHOOL, REDDENDALE, ONT. Frontenac District High School, Hy. 33, Reddendale, Ont. Logan V. Gallaher, 155 Brock St., Kingston, Ont., archt. Awarded Jan. 31.

Chestnut-McGregor Ltd., 7 Hafis Rd., Toronto, Ont., CA Est. **$350,000**. 1 story, 150x320 ft. WAREHOUSE and OFFICE, Leslie St. and Hy. 401, TORONTO, ONT. York Farms Limited, 388 Yonge St., Toronto, Ont. John B. Parkin Assocs., 1500 Don Mills Rd., Postal Station "J", Toronto, Ont., archts. Awarded Feb. 4.

Finley W. McLachlan Ltd., 195 Fairbank Ave., Toronto, Ont., CA Est. **$328,000**. 1 story, 55,000 sq. ft. concrete, steel, brick FACTORY, Norsemen St., TORONTO, ONT. Index Card Co. Ltd., 2652 St. Clair Ave. W., Toronto, Ont. Awarded Feb. 4.

Steel Building Sales & Supplies Ltd., 159 Bay St., Toronto, Ont., CA **$200,000**. 30,000 sq. ft. FACTORY addn., TORONTO, ONT. J. Brockhouse & Co. (Canada) Ltd., 542 Evans Ave., Toronto, Ont. Awarded Feb. 1.

Ramsay Contracting Co. Ltd., 170 Perth Ave., Toronto, Ont., CA Est. about **$390,000** (11 bidders) SCHOOL, Sheppard Ave.-Keele St., TORONTO, ONT. North York Twp. Bd. Educ., 7 Kenneth St., Willowdale, Toronto, Ont. Bids Jan. 24, awarded Feb. 6. CD 1/11.

▲ **Louisville Construction Ltd.**, 9 Royale N. St., Louisville, Que., CA **$1,082,370** (5 bidders) SCHOOL and RESIDENCE, Academie St. Louis DeGonzague, LOUISVILLE, QUE. La Commission Scolaire de Louisville, Louisville, Que. Bids Jan. 29, awarded Feb. 5.

Antonio Dagenais, 1925 Gouin Blvd. E., Montreal, Que., Owner Builds, **$110,000**. 3 story, 50x100 ft. steel, brick WAREHOUSE and OFFICE, 6615 Park Ave., MONTREAL, QUE. Roger Chalifoux & Richard Geoffroy, 6265 Papineau Ave. Montreal, Que., archts.

ALASKA

HEAVY CONSTRUCTION—BA

† **Alaska, Galena**—RUNWAY—BA 3/12—U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash., runway exten., access road and high-intensity runway and approach lighting.

† **Alaska**—OVERHEAD DISTRIBUTION LINES—BA 3/15—U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash., 37 mi. 7,200 v. overhead distr. lines to four Nike sites, Eielson Air Force Base, Inv. 57-31. CD 11/25/52.

LATIN AMERICA

HEAVY CONSTRUCTION—LB & CA

▲ **VENEZUELA**—Ministerio de Obras Publicas, Direccion de Carreteras, Centro Simon Bolivar, Torre Sur Caracas D. F., Venezuela,

Proyectos y Construcciones, C. A., Centro Professional del Este, Sabna Grande, Caracas D. F., Venezuela. LB **$5,345,848**. (6 bidders) 30 mi. stretch of hy. between town of LaCuchilla and Pan American Hy. in Marida state. Bids Feb. 4. CD 1/29.

AMERICANS ABROAD

HEAVY CONSTRUCTION—BA

† **Spain, Rota**—INFIRMARY, etc.—BA 2/27—Bureau Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C. U.S.A., infirmary, dental clinic and morgue, ROT-43, Spanish Air Base Program.

HEAVY CONSTRUCTION—LB & CA

† **Frederick Snare Corp.**, Havanna, Cuba, CA **$36,755** tracking units for earth satellite for Vanguard at Havanna, CUBA. U. S. Eng., P. O. Box 4970 Jacksonville, Fla., U. S. A. Bids Jan. 10. CD 12/20.

† **Carribean Constr. Corp.**, Coral Gables, Fla., U. S. A. CA **$59,443** tracking units for earth satellite "Vanguard" at Quinto, ECUADOR. Area Engineer, Panama Canal Zone. Bids Dec. 27.

† **Mito Fazio y Cia**, Lima, CA **$24,567** tracking units for earth satellite "Vanguard" at Ancon, PERU. Area Engineer, Panama Canal Zone.

† **Grandson**, Madrid, Spain, LB **$355,000** (6 bidders) officers quarters, mess and club, MOR-33, Spanish Air Base Program, MORON, SPAIN. Bureau Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., U. S. A. Bids Jan. 30. CD 1/11.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Conn., New Britain**—City, City Hall, filtration plant addn. to handle increased load of 36-in. pipe line planned, 2 new filter beds to raise nominal purification from 10 to 14 million gallons per day, **$1,225,000**; Henry Souther Eng. Corp., 11 Laurel St., Hartford, consult. engrs; 36-in. water pipe line from White's Bridge Pumping Station, Bristol to Shuttle Meadow Reservoir, Southington, **$1,500,000**. Robert A. Hurley & Assocs., 99 Outlook Ave., West Hartford, consult. engrs. George W. Wood, ch. water engr. CD 7/16.

Ill., **Bellwood**—Village, water system, Eastern Ave. to 48th Ave. **$125,000**. Edwin Hancock Eng. Co., 1509 W. Jackson Blvd., Chicago, consult. engr.

(Continued on page 270)

BITUMULS SOIL COVER holds mulch on new-cut banks

NOW... fast, low-cost erosion control

EROSION CONTROL has long been a problem for Roadbuilders where cut-and-fill is required in construction.

Now, thanks to the combination of effective spreading equipment and the holding power of Bitumuls® Soil Cover, this problem has been largely eliminated. Our engineers have developed Bitumuls Soil Cover specifically to combat this type of erosion.

The purpose of the Bitumuls Soil Cover Treatment is to "give nature a chance" after road construction has created . . . on cut or fill . . . an exposed area. Seed retention and growth on such areas is, under any conditions, slow and hazardous. Bitumuls Soil Cover with mulch creates an artificially-held bed for seed-development that resists the action of wind and rain.

Foremost in the equipment field are the machines of the *Finn Equipment Company, of Cincinnati, Ohio,* whose "Mulch Spreader" applies this special Bitumuls adhesive with straw mulch at the rate of one-and-one-half tons of straw per acre of exposed soil. Under average conditions, each ton of straw will require from 100 to 200 gallons of Bitumuls Soil Cover.

For full information on Bitumuls Soil Cover, call our office nearest you.

TESTED, PROVED, *SPECIFIED AND USED* on thousands of acres on the Ohio, Indiana and West Virginia turnpikes, Bitumuls Soil Cover offers these advantages to any Roadbuilders:

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San Juan 23, P. R.
Tucson, Ariz.
Inglewood, Calif.
Oakland 1, Calif.
Portland 7, Ore.

(Continued from page 268)

Ill., Gurnee—Village, Village Hall, water mains, Grand Ave. $214,000. Baxter & Woodman, 68 N. Williams St., Crystal Lake, consult. engrs.

Iowa, Delta—City, City Hall, water system. $65,000. Garden Eng. Co., Oskaloosa, engr.

Minn., Hopkins—City, S. Frissell, mgr., furnish, install rust removal plants at each of three city wells. $200,000. P. S. Sidney-Smith, city engr. Constr. in 1957.

Tex., Bonham—City, survey lake for water supply. $250,000. Wisenbaker, Fix & Associates, 1500 Peoples Bank Bldg., Tyler, consult. engrs. CD 11/21.

Tex., El Campo—City, 750,000 gal. elevated water storage tank. $70,000; water distr. lines, $90,000; water pumping station imprvs., $60,000. Revenue bonds voted Dec. 18. CD 6/6.

Tex., Houston—Harris Co. Water Control & Imprvt. Dist. 63, c/o Comrs. Court, Court House, cancelled Feb. 12 bond election, deep water supply wells. $100,000. elevated water storage sys., $100,000. CD 1/29.

▲ **Tex., Mesquite**—City, City Hall, voted bonds Jan. 29. WW $1,500,000. CD 1/7.

Wash., Seattle—City, City-County Bldg., Seattle, Zone 4, automatic chlorinating works at 7 reservoirs and 1 pumping station, $275,000. J. R. Heath, water supt.

SEWERS, WASTE DISPOSAL

▲ **Calif., Florin**—Florin Community Services Dist., c/o Loren S. Dahl, atty., P. O. Box 924, Sacramento, bond election Apr. 9, sewage treatment plant and sewer lines. $1,000,000. Laugenour & Miekle, 200 College Ave., Woodland, consult. engrs.

▲ **Calif., Redding**—City, City Hall, sewer addns. (1) trunk sewer, $798,500 (2) interceptor sewer, $1,318,000 and primary treatment plant, $344,000. Clair Hill, 1525 Court St., consult. engr. CD 3/14.

▲ **Calif., San Bernardino**—City, City Hall, $4,900,000 bond election Mar. 19, sewerage collection sys. addns., imprvs., treatment and disposal sys. and related projects. Curry Eng. Co., Andreson Bldg., San Bernardino, engr. CD 2/6.

Colo., Boulder—East Boulder Sanitation Dist. and Ripple & Howe, consult. engrs.-archts., 833 23 St., Denver, sewerage sys. expansion. $500,000.

Ill., Wilmington—City, City Hall, sewers, sewage treatment plant addn. $354,354. Baxter & Woodman, 68 N. Williams St., Crystal Lake, consult. engrs.

Kan., Lawrence—Kroh Brothers Realty Co., (John Kroh and Gene Kroh), Lawrence, enlargement of privately owned sewage plant. $300,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., consult. engrs.

▲ **Mich., Livonia**—City, Marie W. Clark, city clk., 33001 Five Mile Road, storm sewers. $9,000,000. Hubbell Roth & Clark, Inc., 954 North Hunter Blvd., Birmingham, consult. engr. CD 2/24/55.

Minn., Coleraine—Village, Mrs. R. Harris, clk., storm sewers. $155,000. R. J. Ellison, 2055 Bayard Ave., St. Paul, consult. engr. Constr. in 1957-58.

Minn., Coleraine, Bovey—Villages of Coleraine and Bovey (jointly), sewage treatment plant, interceptors. $317,000. R. J. Ellison, 2066 Bayard Ave., St. Paul, consult. engr. Constr. in 1957.

Minn., Wykoff—Village, P. J. Kabus, clk., sanitary sewers and sewage treatment plant. $223,000. R. J. Ellison, 2066 Bayard Ave., St. Paul, consult. engr. Constr. in 1957-58.

▲ **Mo., Raytown**—City, bond election May 14, sewerage sys. $3,200,000. CD 11/9/55.

N. J., Clark—Clark Twp., Municipal Bldg., Westfield Ave., first phase, sewerage system exten., southwestern sect. of twp. $286,000. Alonzo Lawrence, Township Hall, consult. engr.

O., Brilliant—VILLAGE, Village Hall, sewage disposal plant. $190,000. Bird & Tietzel, 1989 Guilford St., Columbus, consult. engrs.

▲ **O., Dayton**—City, City Hall, Karl Woditsch, serv. dir., incinerator for northeastern section of city. $1,350,000.

O., Northfield—Village, Julius Bonk, mayor, Village Hall, sewers, disposal plant. $375,000

Tex., El Paso—Public Service Bd., 419 N. Stanton St., sewage plant extens. $560,000. applied for federal funds. CD 12/17/54.

Tex., Houston—Harris Co. Water Control & Imprvt. Dist. No. 63, c/o Comrs. Court, Court House, cancelled Feb. 12 bond election, sanitary sewers, $225,000, sewerage treatment plant, $250,000, drainage system, $500,000. CD 1/28.

▲† **Tex., Lackland Air Force Base**—U. S. Eng., Box 1229, Galveston, sanitary sewage disposal. $5,000,000. Frank T. Drought, 342 W. Woodlawn, San Antonio, consult. engr. CD 5/2/51.

▲ **Tex., Mesquite**—City, City Hall, voted bonds Jan. 29. sanitary sewers, $1,000,000; storm sewers, $500,000. CD 1/9.

▲ **Wash., Aberdeen**—City, City Hall, sewage disposal system. $2,000,000. Stevens & Thompson, Spalding bldg., Portland, Ore., consult. engrs. CD 3/30/55.

Wis., Beloit—City, City Hall, sewage treatment plant $893,250. Jensen & Johnson, 108 W. Court St., Elkhorn, consult. engrs. CD 9/19.

Wis., Ellsworth—Village, Village Hall, sewage disposal plant, $100,000. H. T. Hagestad, River Falls, consult. engr. Bids this summer.

▲ **Wis., Whitehall**—City, sewage treatment plant. $210,000. Garnock Engr. Co., 128½ Graham Ave., Eau Claire, consult. engr. CD 6/30/50.

BRIDGES

▲ **Ill., Chicago**—City, City Hall, reconstr., redecking North Michigan Ave. bridge. $1,396,000.

Mo., Kansas City—City, City Hall, bridge over Brush Creek at Roanoke Parkway and approaches North and South driveways of Ward Parkway, 4-lanes, trimming with native stone and aluminum handrails. $180,000. Edw. W. Tanner, 310 Ward Parkway, Kansas City, Mo., archt.

SOUTH DAKOTA—State Hy. Comn., Pierre,
Aberdeen—overpass at Aberdeen. $800,000. D. W. Loucks, c/o owner, state engr.

Tex., Houston—City, City Hall, con., steel underpass, T&NO Ry. yards, in Center and Sellers Streets area, concrete deck, incl. storm sewers. $650,000. Lockwood, Andrews & Newman, 1010 Waugh St., consult. engrs. CD 6/8/50.

Tex., Houston—City, widening Waugh Drive, steel concrete bridge over Buffalo Dr. $200,000. Francis J. Niven & J. A. McKenzie, 208 W. Jax St., consult. engrs. CD 2/2/56.

Wash., Seattle—City, County—City Bldg., Seattle, Zone 4, rein.-con. bridge over north fork of Tolt River preliminary to constr. of storage dam, $115,000. J. R. Heath, water supt. Bids this spring.

STREETS AND ROADS

Ill., Clarendon Hills—Village, Village Hall, paving, $250,000. Wight & Co., 102 S. Cook St., Barrington, consult. engrs.

Ill., Estherville—Emmet County, Corwin B. Keith, aud., Court House, road grading 11.5 mi. $60,000; bit. paving 9.3 mi. $230,000.

▲ **Ill., North Chicago**—City, underpass and access roads, 22nd and C & W NW RR tracks. $4,500,000. DeLeuw, Cather & Co., 150 Wacker Dr., Chicago, consult. engrs.

Ill., Zion—City, paving, concrete curbs, gutters, $450,000. Wm T. Hooper Jr., 520 N. Western Ave., Lake Forest, consult. engr.

Ind., Gary—City, City Hall, widening Cleveland St. between U. S. 30 and U. S. 6 and extending from U. S. 6 to near Tri-State Expressway, $900,000.

Iowa, Sidney—Fremont Co., Sidney, county road paving, imprvs. $228,194.

▲ **NEW YORK**—Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany,
Chemung Co.—new arterial connection between Rtes. 13 and 17 in town of Horseheads, east of village of Horseheads and will extend from a point on new Elmira-Horseheads Connection Rte. 17, about 2¾ mi. to a point existing Rte. 13 approx. 2¼ mi. northeast of the village, $1,000,000.
Erie Co.—service roads for proposed elevation of Fuhrmann Blvd., $1,000,000.
elevation of 1.8 mi. sect. of Fuhrmann Blvd. from southerly end of Buffalo Skyway to Union Ship Canal viaduct, Buffalo, $19,000,000.
Herkimer Co.—reconstr., approx. 6¼ mi. Rte. 28 between Otsego-Herkimer Co. line and Hamlet of Getmans Corners, $260,000.
Monroe Co.—constr. Innerloop in the city of Rochester between Front St. and George St. approx. 1.6 mi., hy. consisting of two 28 ft. roadways separated by center mall and is depressed for most part of its length with bridges at Clinton Ave., north, St. Paul St., Joseph Ave., North St., Scio St., East Main St., Union and University Aves., East Ave. and Court St.;
interchanges at Joseph and Clinton Aves., North St. and at University-Union-Main St. East Intersection, surface connections at Water St., Charlotte St. and George St. section of the Clinton Ave., Expressway north of New York Central Station out to Kelly St. also included is section of Union St.-Goodman St. arterial, Rochester, $3,000,000.
Nassau Co.—traffic interchange at Sunrise Hy. and Merrick Rd. in Rockville Center, $2,823,000.
Seneca Co.—reconstr. part of Rte. No. 96 from Ontario Co. line to its intersection with Virginia St. in village of Waterloo distance 5.42 mi., $200,000.
Suffolk Co.—reconstr. approx. 2.7 mi. Bridgehampton-Devon, State Hy. 1524, touring Rte. 27 near Amagansett from Skimhampton Rd., easterly to Cranberry Hole Rd., improvement will consist essentially of wid'n. from present 20 ft. to a new width of 24 ft. incl. realignment, $100,000.
reconstr. approx. 2.26 mi. Rte. 25, east of Laurel overpass of Long Island R. R. and extends easterly through the hamlet of Mattituck to a point east of Union Free School Dist. No. 9 near Sunset Rd., $100,000.

▲ **NEW YORK**—Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany,
Chenango Co.—reconstr. approx. 7⅓ mi. Rte. 12 between hamlet of Chenango Forks and village of Oxford, existing location in villages of Brisben and Greene, $800,000.
Erie Co.—reconstr. approx. 6.6 mi. U. S. Rte. 20A between Orchard Park and East Aurora, incl. 1.1 mi. in village of Orchard Park. $300,000.
Erie and Niagara Counties—reconstr. approx. 2.5 mi. Rte. 93 from Rte. 5 through the village of Akron to north village line, and reconstr. of two bridges north of Akron, Bridge No. 6 over Murder Creek and Bridge No. 12 (Bratts Bridge) over Tonawanda Creek at Erie-Niagara Co. line, total length 3.1 mi. in Erie Co. and 0.3 mi. in Niagara Co. $350,000.
Sullivan Co.—reconstr. approx. 3¼ mi. Hartwood Oakland Valley Rd. in town of Forestburg. $140,000.

▲ **NEW YORK**—Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany,
Erie Co.—reconstr. approx. 2 mi. Touring Rte. 5 from south line of city of Lackawanna to Traffic Circle at Athol Springs, imprv. will be six-lane divided hy. with 3-lanes on existing pavement and 3-lanes on new location, (FAI), $1,000,000.
Oswego Co.—relocation, constr. 7.19 mi. Rte. 59 between cities of Fulton and Oswego, Oswego Co., hy. replacing existing Rte. 57 from north city line of Fulton to south city line of Oswego connecting the north-south arterial routes of both cities now under constr. (FAI) $1,000,000.
Schenectady Co.—Interstate Rte. Connection (Thruway Spur) on new location, constr. expressway with two concrete roadways, each 36 ft. wide, separated by variable median and approx. 2¾ mi. in length, beginning at Altamont Ave. near Watt St. in Schenectady then proceeding northwesterly through Pleasant Valley, thence over tracks of Delaware & Hudson and New York Central R.R., incl. complete traffic interchange in vicinity of General Electric Co., connecting with Rte. 5S about 1 mi. west of Schenectady city line, (FAI), $1,500,000.
Schenectady Crosstown Arterial, on new location constr. of a hy. with two concrete roadways each 24 ft. wide separated by variable width center mall, beginning at proposed Inter-State Rte. connection with vicinity of Tower Ave. and Schenectady city line, proceeding northeasterly crossing Rte. 5 with Rte. 7 approx. 0.4 mi. southeast of Rte. 146 and Rte. 7 intersection, approx. 2.3 mi., (FAI), $750,000.

▲ **N. Y., New York**—President Manhattan Boro, Municipal Bldg., Zone 7 and Triborough Bridge & Tunnel Auth., Admin. Bldg., Randall's Island, Zone 35, reconstr. and rehab. west side (Miller) Hy.; realignment of curves, wid'n. and addnl. exit and entry ramps, $22,200,000. (7-year program), Edwards, Kelcey & Beck, 250 Park Ave., consult. engrs. made survey.

▲ **OHIO**—State Hy. Dpt., Columbus, Zone 15,
Lake Co.—Lakeland Expressway from Vine St. Interchange in Willoughby to Calamity Curve east of Painesville, $15,000,000. Capitol Engineering Assoc., Dillsburg, Pa., consult. engrs.
O., Dayton—Comrs. Montgomery Co., Court House, relocating, widening, resurf. Olive Rd. $120,000; relocation, widening, resurf. Harshamn Rd., $100,000; relocating, widening, resurf. Needmore Rd., $100,000. Carl H. Bauer, c/o owner, co. engr. CD 2/21/45.
Okla., Watonga—Blaine Co., Watonga, postponed Jan. 22 bond election indefinitely, highways. $500,000. Roy Parker, c/o owner, engr. CD 12/5.
Tex., Bay City—Matagorda Co., Bay City, general road improvements in 1957. $125,000.
Tex., Houston—Harris Co. Water Control & Imprvt. Dist. No. 63, c/o Comr. Court, Court House, cancelled Feb. 12 bond election, street imprvs., paving. $371,875. CD 1/28.
Tex., Jasper—Jasper Co., Jasper, voted bonds Jan. 26, road imprvs., Precinct No. 2, $150,000. CD 1/7.
▲ **Tex., Mesquite**—City, City Hall, voted bonds, street imprvs. and paving. $1,250,000. CD 1/7.
Tex., Lubbock—City, City Hall, 136 blks. permanent street paving. $340,000. John Hickerson, city engr. CD 1/16/55.
Tex., Midland—Midland Co., c/o Courthouse, road and bridge maintenance work, grading, drainage, etc. $115,000.

▲ **WASHINGTON**—State Hy. Comn., Olympia,
Lewis Co.—traffic interchange on State Hy. 1 at junction with Secondary St. Hy. 1-P, $518,000.
traffic interchange on State Hy. 1 at junction with Primary St. Hy. 5, $279,000.
traffic interchange on State Hy. 1 at junction with Secondary St. Hy. 5-K, $241,000.
traffic interchange on State Hy. 1 at 13th St. in Chehalis, $226,000.
traffic interchange on State Hy. 1 at National Ave. in Chehalis, $255,000. Bids this year or next. W. A. Bugge, State Hy. dir.

EARTHWORK, WATERWAYS

▲ **Connecticut**—State Water Comm., 165 Capitol Ave., Hartford,
erosion control, Crescent Beach, $102,000.
erosion control, Fairfield Beach, $239,000.
erosion control, Bushy Point, Groton, $52,000.
erosion control, Eastern Point Beach, Groton $44,000.
erosion control, Canoe Harbor, Madison, $158,000.
erosion control, Meadows End., Milford, $83,000.
erosion control, Neptune Park, New London, $64,000.
erosion control, Point O'Woods, Old Lyme, $55,000.
erosion control, Cornfield Point, West Side, Old Saybrook, $50,000.
erosion control, Chalker Beach, Old Saybrook, $96,000.
erosion control, Flying Point, Stony Creek, $48,000.
erosion control, Goshen Cove inlet, Waterford, $67,000.
erosion control, West Beach, Westbrook, $75,000.
erosion control, Ames Point to Oyster River, West Haven, $150,000.

▲† **Pennsylvania**—U. S. Eng., 2635 Abbottsford Ave., Phila., Prompton Dam and reservoir on Lackawaxen River. $5,000,000 ($817,000 appropriated). To start in May.

(Continued on page 272)

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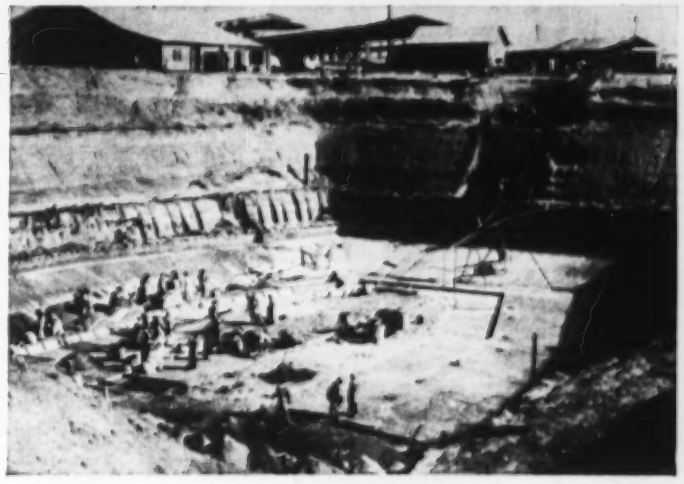

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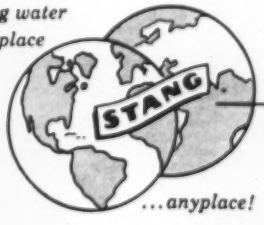

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FROM PUYALLUP*

(Continued from page 270)

▲ **Tex., LaGrange**—Cummins Creek Water Control Imprvt. Dist., LaGrange, 31 dams, comprising a program for Water and Soil Conservation. **$2,000,000.**

Ont., Galt—Grand River Conservation Comn., E. F. Roberts, secy., Box 605, Brantford, culvert, County Road No. 85, Wellington County, in connection with Conestogo Dam. **$333,000.** CD 5/27/54.

Que., Petite Riviere Cascapedia—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., dredging, **$132,000.**

Que., Riviere St. Maurice—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., dredging. **$115,000.**

AIRPORTS

▲† **Calif., Moffett Field**—WIND TUNNEL—Twelfth Naval District, Room C-112, San Bruno, hypersonic wind tunnel, Ames Aeronautical Laboratories, **$11,731,000.**

Fla., Tampa—TERMINAL—Hillsborough County Aviation Auth., Tampa, plans by Eliot C. Fletcher, 404 Marion St., 2 story, 74x293 ft., steel, concrete, brick extension to air lines terminal, Tampa International Airport. **$500,000.**

▲† **Mass., Falmouth**—HOUSING—U. S. Eng., 150 Causeway St., Boston, plans by The Architects Collaborative, 63 Brattle St., Cambridge, 2nd unit, 200 housing units, Otis Air Force Base, **$3,300,000.** CD 8/21.

LATIN AMERICA

▲ **Mexico, Mexico City**—EMBASSY BLDG.—U. S. Govt., Public Bldgs. Dept., F St. between 18 and 19 Sts. N.W., Wash., D. C., plans by Southwestern Architects & Engineers, archts.-engrs., Perry-Brooks Bldg., Austin, Tex., U.S.A., embassy bldg. **$2,000,000.**

Mexico, Tapachula—HOSPITAL—Sria. de Salubridad y Asistencia, Mexico City, Mexico, plans general hospital. **$500,000.**

PUBLIC BUILDINGS

Ala., Childersburg — HOUSING — Childersburg Housing Auth., Childersburg, 30 low-rent housing units, adjacent to Minor Terrace. **$450,000.**

▲ **Calif., Alhambra**—SCHOOL—Alhambra City School Dist., 601 N. Garfield Ave., defeated **$10,900,000** bonds Feb. 5, two schools. CD 8/14.

▲ **Calif., Campbell** — SCHOOLS — Campbell Union High School District, voted $2,500,000 bonds for 3 high schools. **$9,500,000.**

▲ **Calif., Campbell**—SCHOOLS—Campbell Union School District, voted $2,000,000 bonds for schools. **$7,000,000.** CD 12/9/53.

Calif., Ceres—SCHOOL—Ceres Elem. School Dist., c/o Supt., P. O. Box 307, elementary school. **$500,000** allocated.

Calif., Clarksburg—SCHOOL—Clarksburg Union High School Dist., c/o Supt., Box 146, plans by Grand D. Caywood, 2955 3rd Ave., Sacramento, Calif., gymnasium and swimming pool at high school. **$393,000.**

Calif., Clovis—SCHOOL—Clovis Union High School Dist., c/o Supt., 901-5th St., voted bonds Jan. 29, addn. and cafeteria. **$350,000.** CD 12/19.

▲ **Calif., Concord** — SCHOOLS — Mount Diablo Unified School Dist., Concord, plans by Assoc. Architects, c/o Confer & Willis, 366-40th St., Oakland, frame Clayton Valley School. **$2,687,000.** CD 3/7/55.

Calif., Fremont—SCHOOL—Mission San Jose School Dist., c/o Clerk, Fremont, elementary school. **$600,000.**

▲ **Calif., Fresno**—HOSPITAL—Fresno County General Hospital, c/o Bd. Supervs., Court House, plans by Narn & Mortland, 2016 Merced St., Fresno, 6 story, bsmnt., rein.-con. hospital, Cedar Ave. near Huntington St. **$5,000,000.** Bids about Apr. 1. CD 12/8/50.

▲ **Calif., Modesto**—SCHOOLS—Modesto City Elementary High School and Junior College Dist., c/o Supt., 426 Locut, bond election Apr. 9 for Elementary School Dist., $700,000, High School Dist., $1,500,000, and Junior College Dist., $1,000,000. CD 12/3/54.

Calif., Monterey — SCHOOL — Monterey City School Dist., Box 1031, plans by Wm. D. Concolino Jr., 588 Houston St., General Joseph Stillwell Elementary School, Ford Ord site. **$400,000.**

▲ **Calif., Oakland**—JUNIOR HIGH SCHOOL—Oakland Unified School Dist., c/o Secy., 1025 2nd Ave., plans by Anderson & Simonds, 2800 Park Blvd., Frick Junior High School. **$1,413,135.** CD 6/8.

▲ **Calif., Placerville**—SCHOOL—El Dorado Co. Union High School Dist., Placerville, voted bonds Jan. 30, school constr. **$1,200,000.** Gordon Stafford, 1024½ J. St., Sacramento, archt. CD 12/13.

▲ **Calif., Red Bluff**—SCHOOL—Red Bluff High & Elementary School Dist., Red Bluff, voted bonds Jan. 29 high school bldgs., **$660,000;** elementary school classrooms, **$500,000.** CD 10/24.

Calif., Redondo Beach—HIGH SCHOOL—South Bay Union High School Dist. 207, N. Francisca Ave., plans by Flewelling & Moody, 766 Colorado Blvd., Los Angeles, 2nd increment, rein. masonry Aviation High School addns. **$851,000.**

▲ **Calif., Salinas**—SCHOOL—Salinas Union High School Dist., 413 W. Alisal St., voted bonds Jan. 22, high school and Alisal Elementary Schools addns. **$2,500,000.** CD 11/27.

Calif., San Jose—SCHOOLS—Franklin-McKinley Elem. School Dist., c/o Supt., 400 Tully Rd., voted bonds Jan. 25, schools and school repairs. **$500,000.** CD 1/9.

▲ **Calif., Santa Barbara**—SCHOOLS—Santa Barbara School Dist., voted **$10,800,000** bonds Feb. 5, schools. Chester Carjola, 129 DeLa Guerra Studios, Santa Barbara, archt. for Junor High School. Howell, Arent, Mosher & Grant, 217 LaArcada Bldg., Santa Barbara, archts for two elementary schools. CD 12/14.

Calif., Stockton—SCHOOL—Davis Elem School Dist., c/o Principal, Rt. 2, Box 903, Stockton, replacement of old Davis School. **$474,307** allocated.

Calif., Stockton—HOSPITAL—State Div. Architecture, Pub. Works Bldg., 1120 N. St., Sacramento, ward bldg., **$2,506,900.** laundry bldg. addn., **$396,900,** constr. tailor shop, **$128,500,** Stockton State Hospital. Funds allocated.

Calif., Yreka—SCHOOL—Siskiyou Joint Union High School Dist., c/o Supt., Yreka, State aid funds allocated for constr. Weed High School. **$835,973.** CD 4/26/55.

Calif., Yreka—SCHOOL—Siskiyou Joint Union High School Dist., c/o Supt., Yreka, plans by Howard R. Perrin, 1121 Main St., Klamath Falls, Ore., 1 story wood frame with brick veneer high school. **$600,000.** CD 2/1.

▲ **Colo., Colorado Springs**—COURT HOUSE—Bd. Comrs. El Paso Co., Court House, plans by Earle A. Deits, consult. engr.-archt., 413 Mining Exchange Bldg., 5 story, bsmnt., 88,000 sq. ft. court house. **$1,600,000.** CD 4/14/54.

Colo., Greeley—SCHOOL—School Dist. No. 6, 811 15 St., plans by Alfred Watts Grant & Assocs., 1640 E. Court Pl., Denver, 28,550 sq. ft. elementary school, 25 St. and Lewis St. Over **$344,000.** Ken R. White, 3842 Wynkoop St., Denver, consult. engr. CD 9/26.

Conn., Bridgeport—COUNTY JAIL—Comrs. Fairfield Co., Golden Hill St., county jail. **$600,000.**

▲ **Conn., Manchester**—JUNIOR HIGH SCHOOL—Town, plans by Ebbets, Frio & Prentice, 862 Asylum Ave., Hartford, North End Junior High School, off East Middle Turnpike. **$1,000,000.** CD 9/21/55.

Conn., Mansfield—POWER HOUSE, etc.—State P. Wks. Dpt., 165 Capitol Ave., Hartford, power house addn., $211,120; well and pump house, $150,686, at Mansfield State Training School.

▲ **Conn., Middletown**—HOSPITAL—State Pub. Works Dpt., 165 Capitol Ave., Hartford, mental hospital bldg. to replace Hayden Hall, Conn. State Hospital for Female Patients. CD 10/26/45.

Conn., Milford—SCHOOL—Town, Town Hall, plans by Jesse J. Hamblin, 1188 Main St., Bridgeport, Walnut Bech Elementary School. **$900,000.** Frederick P. Clark & Assocs., 41 Theodore Frend Ave., Rye, N. J., consult. engrs. CD 11/7.

▲ **Conn., New Britain**—CLASSROOM—State P. Wks. Dpt., 165 Capitol Ave., Hartford, classroom bldg., Regional Technical Institute. **$3,168,000.**

Conn., New Haven—PHYSICAL EDUCATION—State Public Works Dpt., physical education bldg. New Haven State Teachers College, **$750,000.** physical education field at New Haven State Teachers College, **$175,000.** CD 3/14.

▲ **Conn., Seymour**—HIGH SCHOOL—Town, high school. **$1,200,000.**

▲ **Conn., Stratford**—HOUSING—Town, Town Hall, 200-unit moderate rental housing, **$2,696,000;** 100-unit, moderate rental garden-type apartments for elderly residents, **$1,300,000.**

▲ **Conn., Wallingford**—TURBINES—Borough, Borough Hall, 2 new turbines at electric power plant. **$6,032,400.** Pfeifer & Schultz, 701 Wesley Temple Bldg., Minneapolis, Minn., consult. engrs. CD 4/5/49.

Conn., West Hartford—HIGH SCHOOL—Town, Bd. of Educ., 7 Whiting Lane, plans by Russell Gibson & Assocs, 1009 Farmington Ave., repairing fire damage at Alfred Plant Junior High School. **$500,000.** CD 1/24.

Conn., Westport—SCHOOL—Town, Town Hall, plans by Koelb, Harvey & Provost, 150 Causeway St., Boston, Mass., 1 story, 13,000 sq. ft. Long Lots Junior High School, 10 classrooms, **$345,000.**

Conn., Winsted—HIGH SCHOOL—Town of Winchester, plans by Maimfeldt Assocs., 36 Pearl St., Hartford, high school; William Ave. **$780,000.** Charles A. Currier & Assocs., 967 Farmington Ave., West Hartford, consult. engrs. (site planner). CD 2/15/56.

Fla., Marianna—HOUSING UNITS—Marianna Housing Auth., Marianna, plans by Henry T. Hey, Box 794, 80 housing units, **$600,000.** CD 10/3.

Fla., Miami—WAREHOUSE—Dade Co. P. Instruction, Admin. Bldg., 275 N.W. 2 St., plans by Leroy K. Albert, 269 Giralda Ave., Coral Gables, warehouse and transportation bldg., W. Flagler St. **$250,000.** CD 11/3/55.

Fla., Tampa—CLASSROOMS, etc.—City, Nick C. Nuccio, mayor, City Hall, plans by John J. Kennedy, First Natl. Bank Bldg., one 1 story classrooms bldg. and one 4 story residence for nurses at Gordon Keller Hosnital School of Nurses, Marjorie Park, Davis Islands. **$800,000.**

Fla., Winter Park—OFFICE—State of Florida, Tallahassee, plans by Hugo R. Broleman, Jr., 1216 E. Colonial Dr., Orlando, 2 story, steel, concrete State Office Bldg. **$700,000.**

Ga., Atlanta—CITY HALL—City, City Hall, city hall imprvs. **$400,000.** CD 1/10/53.

▲ **Ga., Atlanta**—POLICE STATION—City, City Hall, police station. **$1,000,000.**

▲ **Ga., Atlanta**—CIVIL COURTS—Fulton Co. Comn., County Court House, civil courts building. **$2,000,000.**

▲ **Ga., Atlanta**—COURT HOUSE—Fulton Co. Comn., Court House, constr. court house renovations. **$2,500,000.** CD 12/19/55.

▲ **Ga., Atlanta**—JAIL—Fulton Co. Comn., Court House, jail. **$3,000,000.**

▲ **Ga., Atlanta**—JUVENILE COURT—Fulton Co. Comn., Court House, juvenile court. **$2,300,000.**

Ill. Chicago—SCHOOL—Chicago Bd. Educ., 228 N. La Salle St., 2 story brick John Hancock School addn. W. 46th Pl. W. Swan and S. Shields Ave. **$500,000.**

Ind., Indianapolis—FIRE STATION—Bd. P. Wks., fire stations, at 24th and Sherman, U. S. 52 near 30th and relocate Station 25, Ritter and Washington, **$405,000.**

Iowa, Cedar Falls—JUNIOR HIGH SCHOOL—Bd. Educ., Cedar Falls, plans by Grow & DeVoe, Cedar Falls, Junior High School. **$500,000.** CD 1/10/55.

Iowa, Council Bluffs—PARKING—City, City Hall, parking structure, 4th and 1st Ave. **$400,000.**

▲ **Iowa, Eldridge**—HIGH SCHOOL—North Scott Community School Dist., Eldridge, plans by R. A. Orput & Assocs., 206 S. Main St., Rockford, Ill., high school. **$1,100,000.** CD 1/18.

Iowa, Guthrie Center — SCHOOL — Bd. Educ., Guthrie Center, plans by J. A. Dougher, 302 Garver Bldg., Des Moines, elementary school. **$595,000.**

Kan., Haysville—SCHOOL—School Dist. No. 187, Sedgwick Co., elementary school. **$350,000.**

▲ **Kan., Merriam**—SCHOOL—Rural High School Dist. 6 of Johnson Co., (Shawnee Mission School Dist.), Dr. Howard D. McEachen, supt., Shawnee Mission High School Bldg., 7401 Johnson Dr., voted **$1,250,000** bonds Jan. 22, Meadowbrook Junior High School, incl. 4 separate units, 3 story, 40x250 ft. classroom unit; 1 story, 80x85 ft. administrative unit; 1 story, 80x185 ft. shop unit, 1 story, 160x160 ft. gymnasium-assembly unit, 8500 Mission Rd., Donald R. Hollis, West 75 and U. S. 50, P. O. Box 71, Overland Park, archt. Perkins & Will, 309 W. Jackson Blvd., Chicago, Ill., consult. archts. CD 11/9/56, under Kan., Kansas City.

▲ **Ky., Louisville**—UNIVERSITY CENTER, etc.—University of Louisville, Third and Shipp Sts., plans by Hartstern, Louis & Henry, McDowell Bldg., university center and student union bldg. **$1,500,000.** CD 11/10/52.

▲ **La., Mamou**—HOUSING UNITS—Mamou Housing Auth., Mamou, plans by Matkin & Fitch, 3105 Rayn St., Lake Charles, 30 housing units. **$348,600.**

Md., College Park—DORMITORY—University of Maryland, College Park, plans by Walton & Maddon, 3510 Rhode Island Ave., Mount Ranier, men's dormitory, dormitory addn., **$450,000.**

▲ **Mass., Auburn**—JUNIOR HIGH SCHOOL—Town, Supt. Schools, Tuttle Sq., plans by Franklyn R. Williams, Inc., 316 Lincoln St., Worcester, Junior High School, Vine St. **$1,500,000.** Constr. in 1957.

▲ **Mass., Cambridge**—SCHOOL—City, City Hall, plans by M. A. Dyer Co., 24 School St., Boston, elementary school, Donnelly Field. **$1,000,000.** Constr. in 1958.

Mass., Cohasset—SCHOOL—Town, School Bldg. Comn., c/o Supt. Schools, Junior-Senior High School addn. **$350,000.** Constr. in 1957.

Mass., Gardner—HOUSING—City, Gardner Housing Auth., 32 Pleasant St., plans by T. Cranston Albro, 111-4 Court Square, Greenfield, motel 30 units, **$360,000.** Constr. in 1957.

▲ **Mass., Lowell**—SCHOOLS—City, School Dpt., City Hall, plans by M. A. Dyer Co., 24 School St., Boston, elementary school, South Common St. **$1,000,000.** Constr. in 1958; Belvidere Elementary School, Douglas Rd. **$425,000.** Constr. in 1957.

Mass., Manchester—SCHOOL—Town, Elementary School Bldg. Comn., c/o Supt. Schools, Lincoln St., plans by M. A. Dyer Co., 24 School St., Boston, school. **$425,000.** CD 7/6/54.

▲ **Mass., Southbridge**—SCHOOL—Town, Robert L. Fox, supt. schools, 82 Marcy St., plans by S. W. Haynes & Assoc., Inc., 336 Main St., Fitchburg, high and grade school, south of Woodward Ave. **$1,795,000.**

Mass., Sudbury—SCHOOL—Town, Rexford Souder, supt. Schools, Wayland Rd., plans by S. W. Haynes Assoc., Inc., 336 Main St., Fitchburg, school. **$450,000.** CD 9/14.

▲ **Mass., Westboro**—HOSPITAL—Commonwealth Mass., Dpt. Mental Health, c/o Div. Bldg. Constr., 38 Chauncy St., Boston, plans by Shepley, Bulfinch, Richardson & Abbott, 1 Court St., Boston, Admission Bldg., State Hospital. **$1,910,000.**

▲ **Mich., Bloomfield Hills**—SCHOOL—Bd. Educ., Bloomfield Hills School District, plans by Smith, Tarapata, MacMahon, Inc., 894 S. Adams, Birmingham, Junior High School, Quarton and Wing Lake Rds., **$1,250,000;** elementary school, Quarton and Bayley Rds., **$600,000.** CD 1/28.

Mich., Charlevoix—HOSPITAL—Bd. Supervs. Charlevoix Co., County Bldg., plans by J. & G. Daverman Co., 924 Grandville Ave. S. W., Grand Rapids, Grandvue Hospital addn. **$500,000.**

Mich., Dearborn—PUBLIC WORKS—City, Mayor Orville L. Hubbard, Dearborn, plans by Harley, Ellington & Day, Inc., 153 Elizabeth St., Detroit, Zone 1, public works bldg. **$250,000.** CD 4/23.

▲ **Mich., Dearborn**—MUNICIPAL—City, Mayor Orville L. Hubbard, Dearborn, plans by Harley, Ellington & Day, Inc., 153 Elizabeth St., Detroit, Zone 1, municipal bldg. **$1,600,000.** CD 3/18/54.

▲ **Mich., Dearborn**—YOUTH—City, Mayor Orville L. Hubbard, Dearborn, plans by Harley, Ellington & Day, Inc., 153 Elizabeth St., Detroit, Zone 1, youth bldg., **$1,000,000.** CD 4/23.

(Continued on page 275)

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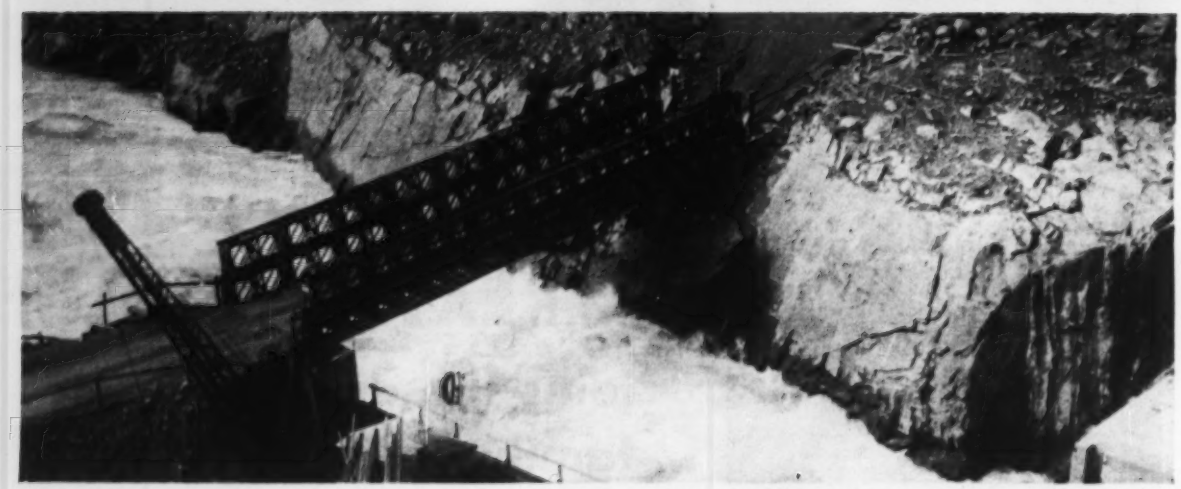

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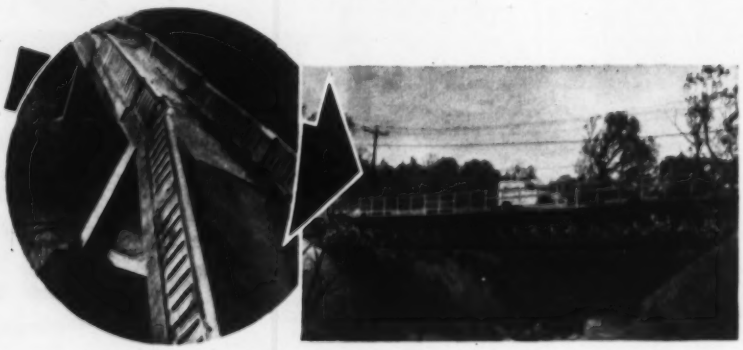

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(Continued from page 272)

Mich., Dearborn—POLICE STATION—City, Mayor Orville L. Hubbard, Dearborn, plans by Harley, Ellington & Day, Inc., 153 Elizabeth St., Detroit, Zone 1, police station. $750,000. CD 4/23.

Mich., Dearborn—HEALTH—City, Mayor Orville L. Hubbard, Dearborn, plans by Harley, Ellington & Day, Inc., 153 Elizabeth St., Detroit, Zone 1, health bldg. $500,000. CD 9/21/55.

▲ **Minn., Excelsior**—SCHOOL—Bd. Educ., Minnetonka School Dist. No. 7, K. Libbey, pres., plans by Bissell & Belair, 1111 Nicollet Ave., Minneapolis, elementary school at Groveland and Cold Springs; elementary school in Excelsior. $1,350,000. CD 3/14/55.

Minn., Hopkins—SHOP—Hennepin Co., R. F. Fitzsimmons, aud., Minneapolis, plans by Liebenberg & Kaplan, 51 South 13th St., Minneapolis, shop for county highway department to house equipment and machinery. $500,000. Probably a 1959 project. CD 8/21/50.

▲ **Minn., International Falls**—SCHOOL—Bd. Educ. plans by A. R. Melander, 603 Alworth Bldg., Duluth, Senior High School. $1,500,000. CD 12/27/44.

▲ **Minn., St. Paul**—EDUCATIONAL CENTER—City, Dpt. Libraries, Auditorium & Museums, S. A. Mortinson, comr., Court House, 15 W. Kellog Blvd., plans by R. Rapson, 720 Washington Ave. S. E., Minneapolis, and Ellerbe & Co., assoc. archts., E. 505 First National Bank Bldg., St. Paul, civic educational center in the Capitol approach area. $1,700,000.

Mo., Independence—SCHOOL—School Dist., voted bonds Jan. 21, Wm. Chrisman High School, $820,000; auditorium, $300,000, U. S. 24 and Noland Rd., Marshall & Brown, 1016 Baltimore St., Kansas City, Mo., archts. CD 12/11.

Mo., Maryville—HEALTH AND PHYSICAL EDUCATION—Northwest Missouri State College, Maryville, plans by Boschen-Herschman-Bayerl, Terminal Warehouse Bldg., Packers Ave., South St. Joseph, 178x215 ft., 48,000 sq. ft., brick, steel health and physical education bldg. $500,000. (Correction—architects' address.) CD 1/15.

▲ **Mo., Moberly**—PRISON—State, Div. of Pub. Bldgs., 100 State Capitol, Jefferson City, medium security prison, $10,000,000, site purchased.

Mo., Parkville—SCHOOL—School Dist. R-5 of Platte Co., Russell James, supt. Schools, plans by V. Preston Terrell, 1016 Baltimore Ave., Kansas City 5, Mo., 1 story, 60x300 ft. masonry Senior High School, $450,000. CD 11/21.

Mo., Raytown—SCHOOL—Raytown School Dist. No. 2, voted $650,000 bonds Jan. 22, Junior High School, $500,000; Eastwood School addn., $150,000, Marshall & Brown, 1016 Baltimore Ave., Kansas City 5, Mo., archts. CD 1/3.

Mo., Riverview Gardens (St. Louis 15 P. O.)—SCHOOLS—School Dist. of Riverview Gardens, Bd. Educ., E. M. Lemasters, Supt. Schools, 587 Chambers Rd., Riverview Gardens, Zone 15, plans by Hellmuth, Obata & Kassabaum, 315 N. 10th St., St. Louis, Zone 1, and Manske & Dieckemann, 9947 Riverview Dr., St. Louis, Zone 15, Marvin L. Thomas School, $350,000; library, business education and administrative high school, $400,000. CD 2/4.

▲ **Mo., Webster Groves (St. Louis 19 P. O.)**—SCHOOL—School Dist. of Webster Groves, Bd. Educ., 16 Selma Ave., defeated $3,175,000 bonds Feb. 5, Junior High School, elementary school, school imprvs. CD 1/17.

Mont., Fort Benton—SCHOOL—Choteau County School Dist. 1A, Fort Benton, plans by Knight & Van Teylingen, 305 Masonic Temple Bldg., Havre, 1 story, 30,000 sq. ft. masonry Senior High School. $450,000. Bids by March 1.

Mont., Sidney—SCHOOL—Sidney High School Dist., Sidney, plans by Nordquist & Sundell, 1233 N. 27 St., Billings, Junior High School. $350,000.

▲ **N. J., Plainfield** — HOSPITAL — Muhlenberg Hospital, Park Ave., plans by Ferrenz & Taylor, 152 West 42nd St., New York, N. Y., 3 story main hospital addn. $1,500,000.

N. J., Scotch Plains—SCHOOLS—Bd. Educ., Twp. of Scotch Plains, plans by Mickleweright & Mountford, E. Stuyvesant Ave. at Prospect St., Trenton, high school addns., $653,179; Shackamaxon School, $353,733. CD 6/27.

N. J., Waretown—SCHOOL—Bd. Educ., Twp. of Ocean, Waretown, plans by Hankin, Stull & Backes, 495 W. Hanover St., Trenton, elementary school, Rte. 9. $350,000.

▲ **N. Y., East Meadow**—SCHOOL—East Meadow School Bd., project approved by referendum vote on Jan. 26 school addns., $3,000,000. CD 1/14.

N. Y., East Meadow—LIBRARY—East Meadow Library Bd., 2306 Hempstead Turnpike, project voted down by referendum vote on Jan. 26, air-conditioned library at Newbridge Ave. and Front St. $526,000. CD 1/11.

▲ **N. Y., Westbury**—HIGH SCHOOL—Bd. Educ., plans by Eggers & Higgins, 100 E. 42nd St., New York, Zone 17, high school. $2,000,000.

▲ **N. Y., Williamsville**—SCHOOL—Williamsville Central School, bond election Mar. 2, Junior High School, $2,800,000. Duane Lyman & Assoc., 505 Delaware Ave., Buffalo, archts.

▲ **N. C., Raleigh**—SCHOOLS—Bd. Comrs. Wake Co., Court House, voted bonds Jan. 29, city and county schools. $6,500,000. CD 12/7.

O., Beachwood—SCHOOL—Beachwood Bd. Educ., 24601 Fairmont Blvd., Cleveland, Zone 24, bond election May 7, high school, $465,000, Fulton, De la Motte & Assoc., 6014 Euclid Ave., Cleveland, Zone 3, archts.

O., Canton—HIGH SCHOOL—Jackson Local School Dist., Canton, bond election May 7, high school addn. and other addns. $930,000.

▲ **O., Cleveland Heights**—HIGH SCHOOLS—Bd. Educ., 1749 Lee Rd., Cleveland, Zone 18, bond election May 21, high school, $3,460,000, Outcalt, Guenther, 13124 Shaker Sq., Cleveland, Zone 20, archts. remodel high school, $1,000,000. Spahn & Barnes, 1950 Lee Rd., Cleveland, Zone 18, archts. CD 11/11/55.

O., Dayton—SCHOOL—Bd. Educ., Wayne Twp. School Dist., Harold T. Wright, supt., 348 W. 1 St., high school, Rte. 202, 5 mi. northeast of here. $600,000.

▲ **O., Newark**—SCHOOLS—Newark Bd Educ., Newark, bond election May 7, 3 elementary schools and 1 high school $4,830,000.

O., Wilberforce—LIBRARY—Ohio State Dpt. Wks., 705 Ohio Dpt. Bldg., Columbus, Library at Central State College. $492,000. CD 11/15/55.

Okla., McAlester—SCHOOL—Bd. Educ., McAlester, voted bonds Jan. 22, elementary school. $450,000. Rex Collins, McAlester, archt.

Okla., Woodward—SCHOOL Bd. Educ., Woodward, defeated bonds Jan. 22, high school. $475,000. Hudgins-Thompson-Ball & Assocs., 1411 Classen Blvd., Oklahoma City, archts. CD 1/17.

Ore., Ashland—SCIENCE CLASSROOM—Oregon Bd. Higher Educ., University of Oregon, Eugene, science classroom building, $460,000; central heating plant, $410,000, Southern Oregon College of Education. CD 3/29.

▲ **Ore., Corvallis**—DORMITORIES—Bd. of Higher Educ., University of Oregon, Eugene, two dormitories, Oregon State College. $1,220,000.

▲ **Ore., Eugene**—CLASSROOM, etc.—Oregon Bd. Higher Educ., University of Oregon, Eugene, classroom and office addn. to Johnson Hall, $1,430,000; central heating and power plant addn., $495,000; dormitory, $515,000; swimming pool addn. of University of Oregon men's physical educ. bldg., $450,000. CD 3/29/48.

Ore., La Grande—HEATING PLANT—Oregon Bd. Higher Educ., University of Oregon, Eugene, central heating plant, $220,000; physical education bldg., $630,000, Eastern Oregon College of Education. CD 2/17/56.

Ore., Portland—SCHOOL—School Dist. No. 1, 631 N.E. Clackamas St., plans by Wick & Hilgers, Portland Trust Bldg., addn. to Chief Joseph Primary School. $334,770. CD 9/20.

▲† **Ore., Portland**—SPORTS And CONVENTION CENTER—City, City Hall, sports and convention center, $8,000,00.

▲ **Pa., Annville**—SCHOOL—Annville-Cleona Joint School Dist., c/o J. C. Dunlap, Annville, plans by Ed. Scholl, 136 Robeson St., Reading, high school, $1,500,000.

Pa., Lebanon—SCHOOL—South Lebanon School Dist., c/o R. A. Kurtz, Lebanon R.D. 1, plans by F. G. Good Jr., 904 N. Second St., Harrisburg, elementary school, $500,000.

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▲ **Pa., Mountaintop**—SCHOOL—Central Luzerne County Joint School Dist., Mountaintop, plans by E. G. Good, Jr., 904 N. Second St., Harrisburg, school. $1,000,000.

Pa., New Kensington—MUNICIPAL, etc.—City, 1050 Fourth Ave., plans by Allen E. Albig Assoc., 5912 Pen Ave., Pittsburgh, 2 story, bsmt., 15,000 sq.ft., 1 story bsmnt., 5,000 sq. ft. brick, block municipal bldg. and fire station, $425,000.

R. I., Narragansett—SCHOOL—Town, School Comn., Wilson Little, chn., plans by Linwood A. Gardiner, 170 Westminster St., Providence, and The Maimfeldt Assoc., assoc. archts., 36 Pearl St., Hartford, elementary school, Dillon Rd. $700,000. (Correction-architect). CD 2/19/56.

S. D., Vermillion—DORMITORY, etc.—University of South Dakota, Vermillion, plans by Hugill, Blatherwick, Fritzel & Kroeger, Suite 366, Boyce-Greeley Bldg., Sioux Falls, dormitory and apartment projects. $650,000. CD 11/11/55.

Tenn., Nashville—SCHOOL—Davidson Co. Bd. Educ., Nashville, plans by George D. Waller & Son, 3rd Natl. Bnk. bldg., Junior High School, Franklin Rd. $500,000.

Tenn., Nashville—HOSPITAL—Vanderbilt University, Nashville, zone 5, four story wing hospital, $500,000.

▲ **Tex., Fort Worth**—SCHOOLS—Fort Worth Public Schools, Ed. P. Williams, Bus. Mgr., 3210 W. Lancaster, plans by Herman G. Cox, 415 N.P. Anderson Bldg., masonry, Como Elem. School in Lake Como Area, $606,000; plans by John W. Floor, 1401 W. Lancaster, masonry, Kirkpatrick Elementary School, 3200 Refugio, $560,000; plans by Hedrick & Stanley, 1200 T&P Bldg., 12 classrooms, Meadowbrook Area Elementary School, $434,000; plans by Preston M. Geren, 1607 Fort Worth National Bldg., 20 classrooms, Midwest Airport Elem. School, $554,000; plans by Olin Boese, 8th Floor, T&P Bldg., 16 classroom Northeast Handley Elem. School, $472,000; plans by Robert P. Woltz, Jr., 1030 7th Ave., 14 classrooms, masonry, Wedgwood Elementary School, $468,000. CD 4/13.

Tex., Goliad—HIGH SCHOOL—Goliad Ind. School Dist., Goliad, plans by Herbert E. Kellner, 406 Austin Highway, San Antonio, high school. $500,000. R. C. Rippstein, Transit Twr., San Antonio, consult. engr. CD 1/9/57.

▲ **Tex., Laredo**—SCHOOLS—Laredo Ind. School Dist., Laredo, plans by Caudill, Rowlett, Scott & Associates, engrs.-archts., 425 S. Main St., Bryan, 21-room elementary school, $365,000. Group of 56-Secondary Elementary Classrooms, $350,000. Group of 56 elementary school classrooms, $375,000, group classroom addns. to upper grade schools, $410,000. CD 7/25.

▲ **Tex., San Antonio**—SCHOOL—Northside Independent School Dist., Eckert Rd., plans by Marmon-Mok, 614 S. Texas Blvd., defeated bonds Jan. 26, high school. $1,000,000. CD 1/16.

Utah, Farmington—SCHOOLS—Davis Co. Bd. Educ., Farmington, elementary schools for Davis Co. $563,000. CD 6/9/54.

▲ **Utah, Ogden**—GYMNASIUM—State Building Bd., J. G. King, constr. supt., 419 State Capitol, Salt Lake City, gymnasium and athletic bldg., Weber College $1,498,000.

▲ **Va., Fairfax**—SCHOOLS—Fairfax Co. Bd. Educ., Court House, Fairfax, plans by Hayes, Seay, Mattern & Mattern, 1615 Franklin Rd. S. W., Roanoke, Munson Hill High School, $2,300,000; plans by Dixon & Norman, 1103 E. Main St., Richmond, elementary school, Edisol Park, $350,000; plans by John M. Walton & Assocs., 2049 N. 15 St., Arlington, Parklawn Elementary School, $375,000. CD 11/11/55.

▲† **Wash., Bremerton**—ENGINEERING—Pub. Wks. Officer, 13th Naval dist., Naval Station, Seattle, plans by Jones & Bindon, Hoge Bldg., Seattle 4, engineering building at Puget Sound Naval Shipyard, $8,000,000. CD 9/30/54.

Wash., Ilwaco—SCHOOL—School Dist. 113, high school, $600,000.

▲ **Wash., Mount Vernon**—COLLEGE—Union High School Dist. 1, 5 bldgs. 68,000 sq. ft. for Junior College, $1,000,000.

Wis., Amery—HOME FOR AGED—Polk Co., O. Momchilovich, chn. Bldg. Comn., McKinley, plans by A. R. Melander, 603 Alworth Bldg., Duluth, Minn., 1 story, bsmnt. home for aged. $344,000. CD 1/10.

Wis., Nekoosa—SCHOOL, etc.—Bd. Educ., Nekoosa, plans by J. Klund, 929 Applegate Rd., Madison, 3 story 60x132 ft. high schol addn. and elementary school addn. $500,000.

Ont., Brantford—FEDERAL BLDG.—Dpt. P. Wks., Hunter Bldg., Ottawa, federal bldg. $650,000.

Ont., Kitchener—FEDERAL—Dpt. P. Wks., Hunter Bldg., Ottawa, federal taxation bldg. $500,000.

Ont., St. Thomas—FEDERAL—Dpt. P. Wks., Hunter Bldg., Ottawa, federal govt. bldg. $750,000.

Ont., Toronto—PARKING GARAGE—Toronto Parking Auth., 72 Queen St. W., car park with two decks at 500-space lot over rapid-transit subway open cut between Chaplin Cres. and Imperial St. $600,000.

COMMERCIAL BUILDINGS

Ala., Phenix City—HOSPITAL—Cobb Memorial Hospital, Phenix City, rein.-con., masonry hospital annex. $885,000. CD 3/24/53.

▲ **Calif., Pasadena**—OFFICE, etc.—Dalton Corp., c/o Kenneth N. Lind, 943 3/4 N. La Cienega Blvd. Los Angeles, 10 story office, 132 S. Lake Ave. and 4 story garage, $2,700,000.

Calif., Tracy—MOTEL, etc.—Owner, c/o R. W. Siegfried & Assoc., archts., 2132 N. El Dorado St., Stockton, motel and swimming pool. $500,000.

Conn., East Haven—CHURCH—Our Lady of Pompeii Roman Catholic Church, Foxon Park, East Haven, church, Foxon Park, $345,000.

Conn., New Haven—RETAIL and OFFICE—Abner Alderman, 165 Congress Ave., retail and office bldg. College St. Exten. $650,000.

Conn., New Haven—STORE—Charles Brown & James Brown & Son, 25 Temple St., 16-store development, College St. Exten. $650,000.

Conn., Norwalk—SCHOOL—St. Mary's Roman Catholic Church, Norwalk, Catholic High School, West Rock Rd. $750,000. CD 2/8/45.

D. C., Wash.—APARTMENT—Ford Enterprises, 5763 Pinetree Dr., Miami Beach 40, Fla. plans by Corning & Moore, 1302 18th St. N. W., 9 story, 120 units, concrete masonry, apartments, 1414 17th St. N. W., $1,135,000.

▲ **Fla., Miami Beach**—HOTEL—6701 Collins Ave. Corp., Sam Cohen, pres., 6345 Collins Ave., plans by Melvin Grossman, 311 Lincoln Rd. 560-room 14 story, concrete block, rein.-con. Deauville Hotel, 6701 Collins Ave. $8,000,000. Obler & Clarke, 927 Arthur Godfrey Rd., consult. engrs. Project sold. CD 5/16, under CA.

Fla., Sarasota—OFFICE—B and B Investment and Security Co., c/o Ralph A. Erickson, archt., 5130 Ocean Blvd., Siesta Key, Sarasota, 4 story, 75x180 ft. office bldg. $450,000.

Ill., Calumet City—HOUSING—U. S. Eng., Chicago Dist., Merchandise Mart, Chicago, 48 homes, Capehart Housing, vicinity Wolf Lake Sect. $800,000.

▲ **Ill., Chicago**—SHOPPING CENTER—Owner, c/o Jos. D. Teitelbaum, 39 S. LaSalle St., plant by Leonard Wayman & Assocs., 11 S. LaSalle St., shopping center, vicinity Division and LaSalle Sts. $3,000,000.

▲ **Ill., Chicago**—APARTMENT—D. E. Webb Constr. Co., South 23rd Ave., Phoenix, Ariz., apartment. $10,000,000.

▲ **Ind., Valparaiso**—LIBRARY—University of Valparaiso, Valparaiso, plans by Stade, Dolan, Anderson Assoc., 819 Busse Hy., Park Ridge, Ill., library and admin. bldg., campus grounds, $1,200,000. CD 1/16.

Iowa, Waverly—OFFICE—Schield Bantam Co., Waverly, plans by Perkins & Will, 309 W. Jackson, Chicago, Ill., office bldg. $700,000.

Me., Augusta—OFFICE—Owner, c/o State of Maine Employment Security Comn., Llewellyn Fortier, chn., 331 Water St., 2 story office. $400,000.

Me., Brunswick—HOSPITAL—Brunswick Community Hospital, Samuel L. Ladd, Jr., pres. Bd. Trustees, 28 Cumberland St., plans by James H. Ritchie & Assoc., 135 Clarendon St., Boston, hospital. $350,000.

Md., LaPlata—RETREAT HOUSE—Maryland Providence of Jesuits, LaPlata, plans by Patterson & Worland, 1413 K St. N.W., Wash., D. C., retreat house. $650,000. F. X. Wilberding, 1023 20 St. N.W., Wash., D. C., consult. engr.

Mass., Arlington—SCHOOL, etc.—St. Anne's R. C. Church, Msgr. Oscar R. O'Gorman, Medford St., c/o Archdiocese of Boston, 1 Lake St., Brighton, plans by Richard Shaw, 25 Huntington Ave., Boston, parochial high school, athletic field, Summer St. $600,000. Constr. 1957-58.

▲ **Mass., Boston**—COMMERCIAL CENTER—The Prudential Insurance Co. of America, 763 Broad St., Newark, N. J., plans by Hoyle, Doran & Berry, 248 Boylston St., Boston, and Perlira & Luckman, coordinating archt., 9220 Sunset Blvd., Los Angeles, Calif., commercial center, $100,000,000. Metcalf & Eddy, Statler Bldg., Boston, consult. engrs. CD 1/30.

Mass., Cohituate—CHURCH—St. Zepherin's Parish, c/o Archdiocese of Boston, Chancery Office, 1 Lake St., Brighton, plans by James Flaherty, 5 Eastern Ave., Dedham, church, $245,000.

Mass., Fall River—HOSPITAL—Truesdale Hospital, John B. Cummings, pres., 1820 Highland Ave., plans by Samuel T. Tubitsky, 41 N. Main St., Fall River, and James H. Ritchie & Assoc., consult. archts., 135 Clarendon St., Boston, 4 story wing hospital addn., alterations. $400,000. Constr. in 1957. CD 11/18/55.

▲ **Mass., Springfield**—SCHOOL—Diocese of Springfield, Elliott St., plans by Eggers & Higgins, 100 E. 42St., New York, Zone 17, high school, $2,000,000.

Mass., Stoneham—SCHOOL—St. Patrick's R. C. Parish, Rev. S. Sexton, pastor, c/o Archdiocese of Boston, 1 Lake St., Brighton, plans by Chester F. Wright, 681 Main St., Waltham, 2 story, 57x148 ft. parochial school. $350,000.

Mass., Waltham—HOTEL—Cabot, Cabot & Forbes, 60 State St., Boston, masonry, Highway Hotel, incl. 7 bldgs., swimming pool, Wyman and Winter Sts., Rte. 128. $350,000. Constr. in 1957.

Mass., Weymouth—HOSPITAL—South Shore Hospital, 90 Columbian St., plans by Aisner & Atwood, 10 Newbury St., Boston, hospital addn., Columbian St. $400,000. Constr. in 1957.

Mass., Worcester—TELEPHONE BLDG.—New England Telephone & Telegraph Co., 185 Franklin St., Boston, plans by Hoyle, Doran & Berry, 248 Boylston St., Boston, 8 story telephone bldg. addn., 1 story addn. to present bldg. $350,000. Bids in May.

▲ **Mich., Detroit**—BANK—Detroit Bank & Trust Co., 46 State St., Detroit, plans by Harley, Ellington & Day Assoc., 153 E. Elizabeth St., Zone 1, bank, Shelby, Congress, Wayne and Fort Sts. $5,000,000-$10,000,000.

▲ **Mich., Oak Park**—SHOPPING CENTER—Dexter-Davison Chain, Norman and Reuben Cottler, 18207 Wyoming St., Detroit, shopping center, 10 Mile and Coolidge Sts., $1,000,000.

Minn., St. Paul—SHOPPING CENTER—Friendly Hills, Inc., J. Mason, pres., 388 Minnesota St., shopping center in Mendota Heights. $400,000.

Mo., Ladue (St. Louis 24 P.O.)—SCHOOL—Bd. Trustees John Burroughs School, John E. Dube, pres., 755 S. Price Rd., plans by Kenneth E. Wischmeyer, Bd. Educ. Bldg., 911 Locust St., St. Louis, Zone 1, L-shaped school addns., incl. auditorium, $345,000.

▲ **Mo., Pagedale** (St. Louis 14 P.O.)—HOSPITAL—St. Vincent's Hospital, Daughters of Charity of St. Vincent dePaul, 7301 St. Charles Rock Rd., Zone 14, second phase, development and rehab. of hospital, incl. road approach, parking facilities, diagnostic and treatment center, therapeutic activities center, enlargement of psychiatric nursing school. $1,400,000.

▲ **Mo., St. Louis County**—SCHOOL—Catholic Preparatory School for Boys, Inc., Mason Rd. between U. S. 61 and Conway Rd., Zone 24, plans by Hellmuth, Obata & Kassabaum, 315 N. 10 St., St. Louis, Zone 1, school, power plant, dining room facilities, gymnasium, etc. $1,000,000-$1,500,000. CD 2/21/55, under Mo., St. Louis.

Mo., St. Louis—SUPERMARKET—Rapp's Supermarkets, Inc., Fred P. Rapp, pres., 8590 Page Blvd., Pagedale, Zone 14, plans by Russell, Mullgardt, Schwarz Van Hoefen, Chemical Bldg., 721 Olive St., Zone 1, supermarket having 26,500 sq. ft. floor space, 2,500 sq. ft. bsmnt. area on 225x465 ft. tract at northwest corner of Page and Union Blvds. $350,000. Owner changed. CD 8/13/56, under AA Meat Co., as owner.

Mo., St. Louis—ENGINEERING LABORATORY—Washington University, Ethan A. H. Shepley, chancellor, Lindell and Skinker Blvds., Zone 5, plans by Fitch & Nicholas, 5507 Pershing Ave., St. Louis, Zone 12, 3 story, bsmnt., partial air-conditioned engineering laboratory, on campus east of Cupples II engineering laboratories. $900,000. Bids about March.

Mo., Springfield—HOSPITAL—St. John's Hospital, Sisters of Mercy, 1235 E. Cherokee St., 2 story hospital wing addn. for psychiatric care. $600,000.

N. J., Boonton—CHURCH, etc.—Boonton Methodist Congregation, Vreeland Ave., plans by William G. Halsey, III, 25 E. Craig St., Basking Ridge; church, fellowship hall, summer chapel on church property at Lathrop and Vreeland Aves. $350,000.

N. J., Newark—CLUB—Boys Club, 137 Broadway, plans by Frank Grad & Sons, 11 Commerce St., club bldg. in Central Ward. $500,000.

▲ **N. J., Spring Lake Heights**—APARTMENT—Tony Yonadi, Homestead Golf & Country Club, Alair Rd., apartment with underground parking area and swimming pool on Country Club grounds, $12,000,000.

▲ **N. M., Farmington**—OFFICE—Owner, c/o Pierce, Norris, McCutchan & Pace, archts., 1002 W. Wall St., Midland, Tex., 6 story office. $1,000,000. C. W. Ellis, 1002 W. Wall St., Midland, Tex., consult. engr.

▲ **N. Y., Amherst**—SHOPPING CENTER—Northtown Plaza, Inc., Roxie Gian, pres., 210 Cornwall St., Buffalo, 70,000 sq. ft., brick, concrete, addn. to Northtown Plaza Shopping Center, at Sheridan Dr. and Niagara Falls Blvd. $1,000,000.

▲ **N. Y., Lockport**—HOMES—Norman E. Bonner, Lockport, 60-70 homes to be known at Lincolnshire on 21 acre tract south of Lincoln Ave. and east of Transit Rd. $1,250,000. Constr in summer.

▲ **N. Y., New York**—APARTMENT—Doral Constr. Corp., 12 E. 48 St., Zone 17, plans by Sylvan & Robert Bien, 33 W. 46 St., New York, Zone 19, 20 story apartment, 180-194 East End Ave. from 88 to 89 Sts. $4,000,000. CD 8/8/56, 180 East End Corp., as owner.

▲ **N. Y., New York**—HOUSES—New York City Office of Committee on Slum Clearance, Randall's Island, Zone 35, plans by Kelly & Gruzen, 80 Fifth Ave., New York, Zone 3, Title 1, Park Row Houses, S-shaped bldg. for 400 units on tract bounded by St. James Place, Park Row, Pearl St. $7,218,000. Constr. in 1958. CD 4/27/55, under Public Buildings.

▲ **N. C., Rocky Mount**—COLLEGE BLDGS.—Wesleyan College, A. L. Tyler, chn., Rocky Mount, college bldgs., U. S. Rte. 301. Approx. $4,000,000.

▲ **N. D., Grand Forks**—HOUSING—U. S. Eng., Dpt. Air Force, Colorado Springs, Colo., plans by Grosz & Anderson, 3141/2 DeMers Ave., construct and finance, first unit, housing for air force jet base. $3,888,000. CD 1/31/56.

O., Cincinnati—RELIGIOUS-EDUCATION.—Louis Feinberg (Adath Isreal) Synagogue, Reading Rd., plans by Pepinsky, Grau & Schrand, Union Trust Bldg., religious-education bldg. $650,000.

▲ **O., Cleveland**—SHOPPING CENTER—Puritas Center Corp., c/o Thomas A. Ryan, secy., 618 National City Bank Bldg., Zone 14, plans by Jack Alan Bialosky, NBC Bldg., Zone 14, 14-unit, 85,000 sq. ft., brick, concrete block, shopping center and parking area. $1,000,000.

▲ **O., Dayton**—OFFICE—W. L. Borchers, 11 W. Monument Ave., 5 story, 37,500 sq. ft. stainless steel office bldg., 11-13 Stratford Ave. $1,000,000. Will start in 2 or 3 years.

O., Dayton—HOSPITAL—St. Elizabeth's Hospital, 49 Hopeland St., 3 or 4 story east building addn. to house pediatrics, research dpts. and other units. $500,000.

▲ **O., Dayton**—BUILDING—Talbott Corp., 131 N. Ludlow, plans by Lorenz & Williams, 2600 Far Hills, 12

(Continued on page 278)

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(Continued from page 276)

story Talbot Bldg. addn., 118,000 sq. ft. office space, parking for 150 cars. $3,500,000.

▲ **O., Macedonia**—SHOPPING PLAZA—North Summit Shopping Plaza, Inc., Charles Paugh, pres., 6007 Euclid Ave., Cleveland, Zone 3, 1 story, 140,000 sq. ft. 22-unit, brick, block North Summit Shopping Plaza, Rtes. 631 and 8. $6,000,000. Arthur E. Rowe & Assoc., 3125 Prospect Ave., Cleveland, Zone 15, consult. engrs.

Pa., Pittsburgh—CHURCH—Bethel A.M.E. Church, 95 Elm St., plans by Madison & Madison, 1335 E. 105 St., Cleveland, O., 170x70 ft., 45x120 ft., brick, steel L-shaped church, Marconi and Webster Aves., $500,000.

Pa., Elizabethtown — CAMPUS — Elizabethtown College, Elizabethtown, plans by J. A. Hamme, 123 E. Phila. St., York, campus bldg. $800,000.

S. D., Rapid City—SHOPPING CENTER—Owner, c/o Bob Ballmes, superv. engr., 56 St. Andrews, plans by M. O. Nathan, 343 S. Dearborn St., Chicago, Ill., shopping center. $800,000.

S. D., Sisseton—NURSES HOME—Owner, c/o Clarence Herges, archt., First Natl. Bank Bldg., Aberdeen, nurses home. $400,000.

Tex., Abilene—SHOPPING CENTER—Caleb Reed, 1750 N. 12th St., shopping center, N. 12th and Grape Sts. $400,000.

▲ **Tex., Austin**—SHOPPING CENTER—Business Properties, Inc., c/o C. D. Davis, Tyler, plans by Melvin J. Cates, 902 Bryan Pet. Bldg., 175,000 sq. ft., 12 in. masonry walls shopping center, Airport Blvd. $1,250,000.

Tex., El Paso—CLUB HOUSE—Coronado Golf & Country Club Development Co., Inc., c/o Joe Rector, Jr., c/o El Paso Natl. Bank Bldg., club house and appurtenances. $350,000.

Tex., El Paso—SHOPPING CENTER—Coronado Golf & Country Club Development Co., Inc., c/o Joe Rector, Jr., c/o El Paso Natl. Bank Bldg., shopping center. $750,000.

Tex., El Paso—HOMES—Towne Homes, Inc., 604 Cincinnati St., 35 dwellings, in Park Foothills addn. $355,000.

▲ **Tex., Fort Worth**—LIBRARY—Texas Christian University, c/o Dr. M. E. Sadler, pres., University Dr., plans by Pelich, Geren & Hedrick, 1203 Trans-Amer. Life Bldg., 3 story, brick, stone, concrete, etc., library addn., air-conditioned. $1,000,000. CD 3/19/54.

▲ **Tex., Houston**—OFFICE—Leopold Meyer, c/o Wm. A. Smith, San Jacinto Blvd., 10 to 12 story office, bounded by Pierce, Gray, Main and Travis Sts. $11,000,000.

Tex., Houston—APARTMENT—Wm. B. Meyer & W. A. Franklin, 1735 Portsmouth, 50 apartment units. $600,000.

▲ **Tex., Houston**—OFFICE—Wm. A. Smith, Constr. Co., c/o San Jacinto Blvd., 8 story office, foundation for addnl. 12 stories, Pierce St., Main to Travis. $4,000,000.

▲ **Tex., Houston**—CHURCH—South Main Baptist Church, 200 Colquitt St., plans by Wirtz, Calhoun, Tungate & Jackson, 2506 Richton Blvd., church plant expansion program, incl. educational bldg., over 6-year period. $1,650,000. CD 9/12.

▲ **Tex., Houston**—SHOPPING CENTER—The Westbury Company, (Westbury Shopping Center) c/o Ira Berne, 4900 Willowbend Blvd., plans by Irving R. Klein, 1317 Austin St., shopping center, Post Oak Rd. and Willowbend Blvd. $1,750,000.

Tex., Houston—CLUB—Westwood County Club, c/o Old Richmond Rd., plans by Irving R. Klein & Assoc., 1317 Austin St., club and facilities expansion. $800,000.

Tex., Longview—HOSPITAL—Lone Star Steel Co., c/o E. B. Germany, pres., 25½ Highland Park Shipping Village, Dallas, hospital. $350,000.

▲ **Tex., Lubbock**—ADMINISTRATION, etc.—Lubbock Christian College, Lubbock, plans by Atcheson, Atkinson & Cartwright, Sanford Bldg., 1 and 2 story brick administration bldg. $500,000; dormitory, $600,000. CD 9/6.

Tex., Mesquite—SHOPPING CENTER—Roy & Jacobie, 3513 Wentwood, Dallas, shopping center, Burton Rd. and Hickory Tree. $500,000.

Tex., Mesquite—DWELLINGS—Melton Constr. Co., 2930 Commerce St., Dallas, 30 dwellings $355,000; and 25 dwellings $365,000, off Hickory Tree Rd.

Tex., Orange—AUDITORIUM, etc.—First Baptist Church Congregation, Green and 6 Sts., plans by Ben F. Greenwood, 2665 Holcombe Blvd., Houston, auditorium, educational bldg. remodeling existing church, $650,000.

Tex., San Angelo—HOSPITAL—Clinic Hospital of San Angelo, San Angelo, plans by Mauldin & Ballard, Phillips-Talley Bldg., masonry hospital addn. $400,000.

Tex., San Antonio—HOTEL—The Hilton Hotel, S. St. Mary's St., plans by Atlee B. & Rob. M. Ayres, 342 W. Woodlawn, redesigning, remodeling portions existing hotel, $450,000. CD 1/24.

Tex., San Antonio—DORMITORY, etc.—Our Lady of Lake College, 24th and Durango St., women's dormitory, dining hall and infirmary. $763,000.

Tex., Tyler—HIGH SCHOOL—Catholic High School, c/o E. V. McCullogh, pastor, Tyler, masonry Catholic High School, 29-acre site. $350,000.

▲ **Wash., Aberdeen**—HOSPITAL—Grays Harbor Community Hospital Assn., c/o Judge M. T. Kalin, Court House, plans by J. W. Maloney, Central Bldg., Seattle, Zone 4, 100-bed hospital. $1,500,000. Work to start this year. CD 9/26.

▲ **Wis., Milwaukee**—APARTMENT—Frick Hummert & Muehlmeir Inc., 8707 W. North Ave., Wauwatosa, plans by Boswell & Villa, archt-engrs, 1414 N. 12th St., 13 story, 115x135 ft., rein.-con. brick, apartment. $2,000,000.

Wyo., Jackson—HOSPITAL—St. Johns Hospital, Jackson, hospital. $630,000.

Ont., London—SHOPPING CENTER—Pyramid Concrete Products Ltd., 21 James St., Burlington, 24,000 sq. ft., concrete block, structural steel frame, steel shopping center with office on 2nd floor, west of Dominion Store, 1840 Dundas St. E. $750,000.

▲ **Que., Chicoutimi**—GRAND SEMINARY—Diocese of Chicoutimi, Msgr. Georges Melancon, bishop, Chicoutimi, grand seminary, Sydenham Rd. $2,000,000. CD 1/15/47.

Que., Dorion—HOUSING—Alain Construction, Inc., 2 Church Ave., Dorval, plans by Emilien Bujold, 6746 Molson St., Dorval, housing development on new streets. $126,000.

Que, Sorel—HOTEL—Chateau Gai Hotel, 41 rue de la Reine, Sorel, reconstr. 40-room hotel. Over $350,000.

INDUSTRIAL BUILDINGS

Ariz., Tempe—PLANT—Arizona Public Service Co., 501 South 3 St., Pheonix, first unit of Ocotillo Steam plant, near here. $300,000.

Ariz., Yuma—POWER PLANT—Arizona Public Service Co., 501 S. 3 St., Phoenix, power plant, near here. $550,000.

Calif., Emeryville—FACTORY—Grove Controls, Inc., 6529 Hollis St., plans by Theodore A. Thomas, 1209 Solano Ave., Oakland, 1 story, 50,000 sq. ft., steel, brick factory. $250,000.

▲ **Calif., Fresno**—SUB-STATION—Pacific Bros. & Electric Co., 245 Market St., San Francisco, sub-station, E. Bullard St. $1,000,000.

▲ **Calif., Los Angeles**—FACTORY, etc.—Young's Markets, 1610 W. Seventh St., Los Angeles, plans by Albert C. Martin & Assocs., archts.-engrs., 333 Beaudry St., concrete tilt-up, masonry 128,000 sq. ft. warehouse, 30,600 sq. ft. office, 43,200 sq. ft. meat fabricating plant. $1,500,000. CD 5/29.

Calif., Marysville—PLANT—Hugo Del Pero & Assoc., 413 2 St., Yuba City, packing plant, Chestnut St., $200,000.

Calif., Modesto—WAREHOUSES—National Can Corp., Santa Rosa Ave., two warehouses. $107,000.

▲ **Calif., Redwood City**—PLANT—Ideal Cement Co., c/o Pres., Harbor Blvd., plant addns. (new kilns, miscellaneous machinery, related mills). $2,500,000. CD 6/6/55.

▲ **Calif., Turlock**—PLANT—Armour & Co., 370 Townsend St., San Francisco, meat packing plant, 5th and F Sts., near here. $1,000,000.

Calif., Yuba—FRUIT PACKAGE—Di Giorgio Fruit Corp., 350 Sansom St., San Francisco, 1 story 250x140 ft. corrugated iron fruit packing bldg. $100,000.

Conn., Hartford—PLANT—Span Processing Center, c/o Phoenix Insurance Co., 61 Woodland St., plans by Anderson, Nichols & Co., 150 Causeway St., Boston, Mass., 1 story, brick electronic brain plant, with 12,000 sq. ft. work area and office, 103 Woodland St., $300,000.

Conn., New Milford—GARAGE, etc.—Carl H. Lindst, 38 Bridge St., 8,000 sq. ft. commercial garage and 4,000 sq. ft. storage shed garage, storage shed. $120,000.

▲ **Conn., Stratford**—PLANT—Sikorsky Aircraft Div., United Aircraft Corp., N. Main St., 433,200 sq. ft. plant addn. for engineering and service personnel, laboratory, etc. $4,000,000. George H. Miehls, 345 New Center Bldg., Detroit, Mich., consult. engr. CD 11/7.

▲ **Fla., St. Petersburg**—PLANT, etc.—William J. Moran, Inc, Maritime Base, 8th Ave. and 1st St. South, plans by Bail & Assocs., Box 310, Fort Meyers, 250,000 sq. ft. manufacturing plant with offices and cafeteria adjacent to Airport, Pinellas Co. $2,000,000.

Fla., Tampa—PLANT—Coca-Cola Bottling Co., 612 Cass St., plans by Eliot C. Fletcher, 404 Marion St., Coca-Cola Bottling Plant, 13 St. $750,000.

▲ **Fla., Tampa**—BREWERY—Joseph Schlitz Brewing Co., 235 W. Galena St., Milwaukee, Wis., brewery at Old Henderson Air Field. $20,000,000. Stone & Webster Eng. Co., 49 Federal St., Boston, Mass., consult. engr. CD 10/4.

Ga., Waynesboro—FACTORY—Waynesboro Garment Co., Inc., Waynesboro, 25,000 sq. ft. garment mfg. plant addn., $150,000.

▲ **Ind., Wanatah**—PLANT—Kaiser Aluminum & Chemical Corp., U.S. 30 and 421, food container plant addn. $1,000,000.

Me., Lewiston—WAREHOUSE—Central Distributors, Inc., Fernand J. Barriault, mgr., 48 Oxford St., plans by Henry J. Alverti, 53 Tampa St., Lewiston, 120x250 ft. warehouse. $250,000. Bids in February.

Md., Baltimore—WAREHOUSE—U. S. Plywood Corp., 2020 W. Mosher St., plans by Hyman & Flowers, archts.-engrs., 10 W. 25 St., Zone 18, 1 story, brick, concrete, steel 135x200 ft. warehouse, 35x58 ft. office, Quad Ave. near North Point Rd. $200,000.

▲ **Mich., Livonia**—BAKERY, etc.—Koepplinger's Bakery, Inc., 20402 Santa Barbara, Detroit, plans by Cuthbert & Cuthbert, 22222 Ford Rd., Dearborn, bakery and office bldg., Schoolcraft Rd., $1,200,000.

▲ **Minn., North St. Paul**—PLANT—Northern States Power Co., 15 S. Fifth St., Minneapolis, plans by United Engineers & Contractors, Inc., 1401 Arch St., Phila., Pa., propane-air gas plant, near here. $1,500,000. CD 1/28.

▲ **Miss., Columbus**—MILL—Weyerhaeuser Timber Co., Tacoma Bldg., Tacoma, Wash., paper mill. $30,000,000.

▲ **New Jersey**—FACTORY, etc.—Hatfield Wire & Cable Div. of Continental Copper & Steel Industries, Hillside, N. J., factory and warehouse, Northern New Jersey. (Correction—name and address of owner, and site.) CD 1/8, under N. J., Linden.

▲ **N. J., Gloucester**—SWITCHING STATION—Public Service Electric & Gas, 80 Park Place, Newark, switching station, $7,500,000.

N. J., Parsippany-Troy Hills—PLANT—Paquin, Inc., 155 E. 44 St., New York, N. Y., plant. $350,000.

▲ **N. J., Secaucus**—PLANT—Sinclair & Valentine Co., 611 W. 129 St., New York, N. Y., 45,000 sq. ft. plant, incl. underground feeder sys. for delivering liquids to ink mills and varnish kettles, off Secaucus Rd. $1,500,000.

▲ **N. Y., Farmingdale**—WIND TUNNEL—Republic Aviation Corp., Farmingdale, 72x82 ft. wind tunnel for developing aircraft and missiles with speeds to 3,000 m.p.h. $1,000,000. Burns, Roe, Inc., 160 W. Broadway, New York, Zone 13, consult. engr.

▲ **N. Y., New York**—PLANT—New York Times, 229 W. 43 St., Zone 36, plans by Eggers & Higgins, 100 E. 42 St., New York, Zone 17, 14 story newspaper plant, 411 W. End Ave. $40,000,000, Weiskopf & Pickworth, 2 W. 45 St., Zone 19, consult. engrs. Meyer, Strong & Jones, 101 Park Ave., Zone 17, consult. engrs. CD 9/5.

N. C., High Point—FACTORY—Crestwood Furniture Co., High Point, 30,000 sq. ft. furniture factory. $300,000.

▲ **N. C., Shelby**—PLANT—Pittsburgh Plate Glass Co., 1 Gateway Center, Pittsburgh 22, Pa., fibre glass plant. $20,000,000. Lockwood Greene Engineers, Inc., 41 E. 42 St., New York, N. Y. and Montgomery Bldg., Spartanburg, S. C., consult. engr.

O., Akron—SERVICE—East Ohio Gas Co., 19 N. High St., 46,000 sq. ft. service bldg. to house engineering dpt. and customer service training center, Eastwood Ave. and Darrow Rd. $700,000. CD 10/10/52, under Unclassified, Ohio.

O., Solon—PLANT—Cutter Salvage Corp., 1132 E. 60 St., Cleveland, Zone 3, plans by Joseph A. Regner, 13110 Shaker Sq., Cleveland, Zone 20, 14,000 sq. ft. plant, Solon Rd. Approx. $100,000.

O., Wellington — FACTORY — Armco Drainage & Metal Products, Inc., 801 Young St., Middletown, corrugated metal pipe and pipe arches mfg. factory. $400,000.

Pa., Library—LABORATORY—Pittsburgh Consolidation Coal Co., Koppers Bldg., Pittsburgh, plans by Allen E. Albig Assoc., 5912 Penn Ave., Pittsburgh, 2 story, 64x100 ft., steel research laboratory, $500,000.

Tex., Abilene—WAREHOUSE—Abilene Moving & Storage Co., Abilene, 50,000 sq. ft. warehouse for furniture and merchandise. $225,000.

Tex., Abilene—INDUSTRIAL—Geoscope, Inc., Abilene, industrial bldg. (manufacturers of geological equipment for oil field use, 20,000-sffs.) $110,0000.

▲ **Tex., Aransas Pass**—GAS PLANT—Sunray-Mid Continent Co., Aransas Pass, gas plant to process 140,000,000 cu. ft. gas daily, Redfish Bay area. $3,000,000.

▲ **Tex., Bishop**—PLANT, etc.—Celanese Corp. of America, 180 Madison Ave., New York, N. Y. polyethylene plant. $30,000,000; storage, $200,000; loading facilities, $150,000.

▲ **Tex., Corpus Christi**—PLANT—American Smelting & Refining Co., Shell Rd., constr. zinc metal mfg. facilities. $5,000,000. CD 12/18/51.

Tex., Houston—PLANT—Coast Paint & Lacquer Co., 6901 Cavalcade St., doubling plant production, $200,000.

Tex., Houston—PLANT—The Delaney Co., 6119 Fulton St., steel fabricating plant, 80 acre site on Jack Rabbit Rd. $600,000.

Tex., Houston—PLANT—Plastic Applicators, Inc. subsidiary of Rubber Applicators, Inc., 7020 Katy Rd., plant expansion. $350,000.

Tex., Kilgore—PLANT—The Petrolite Corp., Kilgore, chemical plant. $100,000.

Tex., Kilgore—FEED MILL—Texas Feed & Cattle Co., c/o L. M. Cadenhead, Jr., Daingerfield, feed mill. $125,000.

Tex., Mineola—WAREHOUSING, etc.—Bethlehem Supply Co., Mineola, warehousing and plant facilities. $100,000.

Tex., Paris—PLANT—Southern Paper Box Co., Paris, plant addn. $250,000.

Tex., Paris—COMBINED SHOPS, etc.—Texas State Hy. Dpt., Austin, plans by Hedrick & Stanley, consult. engrs. and archts., 904 Fort Worth Ave., Dallas, combined shop, laboratory, warehouse, paint shop. $100,000.

Tex., Pasadena—PLANT FACILITIES—Rohm & Haas Co., 712 Locust St., Phila. 5, Pa., acetyline and ammonia production plant facilities. $20,000,000.

▲ **Tex., Velasco**—PLANT—Dow Chemical Co., Freeport, glycerin plant addn. $3,000,000.

Tex., Plano—PLANT—Murray Gin Co., 3200 Canton St., Dallas, plant, 80-acre site, south of here. $500,000.

Tex., San Angelo—PLANT—Goodyear Tire & Rubber Co., c/o 5544 Armour Dr., Houston, rubber plant, tire testing plant and station, 7500 acre northeast of here. $500,000.

(Continued on page 280)

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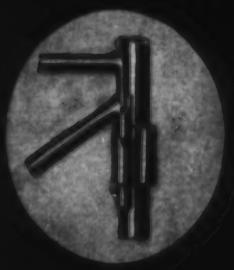

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(Continued from page 278)

Tex., Temple—PLANT—Chupik Wood Mfg. Co., Inc., Temple, plant imprvs. $100,000. CD 7/12/45.

Wis., Milwaukee—STORAGE and PROCESSING—Consumers Waste & Paper Co., 400 E. Bellevie Pl., 1 and 2 story, 150x200 ft., rein.-con., block, storage and processing bldg. $300,000.

Wis., Milwaukee—PARKING PAVILION—A. Coren, 3842 N. 52 St., plans by A. A. Tannenbaum, 3507 W. North Ave., 3-level, 118x121 ft. parking pavilion. $250,000.

Wis., Peshtigo—STORAGE, etc.—Badger Paper Mills, Inc., Peshtigo, 2 story, 100x200 ft. concrete, steel, brick, storage and mfg. bldg. $200,000.

Wis., Racine — FACTORY, etc. — Wiscon Products Co., 519 Center St., plans by Hans M. Geyer, 1408 Washington Ave., 1 story, 100x150 ft. factory and office, $100,000.

Ont., London—PLANT—Scotsmith Furniture Co., 703 Central Ave., church furniture mfg. plant. $100,000.

Ont., North Bay—SERVICE CENTER, etc.—International Harvester Co. of Canada Ltd., 200 Hillyard Ave. Hamilton, plans by Kyles & Kyles, 247 John St. S., Hamilton, 18,343 sq. ft., timber, block district service center and office bldg., 2½ acre site on present North Bay Trans-Canada by-Pass, $400,000.

▲ **Que., Montreal**—PLANT—Canadian Steel Foundries (1956) Ltd., 5227 Notre Dame St. E., 75,000 sq. ft. plant addn. $5,000,000-$6,000,000. Bids in a month.

Que., Montreal—WAREHOUSE—Peter Prescesky, c/o Ben-Ami Shulman, archt., 5174 Cote de Neiges Rd., 2 story brick, concrete warehouse exten., Paul Kruger St. near 4 Ave., Rosemount, $400,000.

UNCLASSIFIED

Alabama—STANDBY DISTRIBUTION PLANT—Southeast Alabama Natural Gas Dist., Dothan, standby distribution plant for peak load periods, Dothan, Houston Co. $250,000. Robert R. Martin, c/o owner, ch. engr. CD 3/3/52.

▲ **Arizona** — ELECTRIC AND GAS DISTRIBUTION LINES—Arizona Public Service Co., 501 South 3 St., Phoenix, electric distr. lines, $9,300,000; transmission lines, $4,000,000; gas lines, $1,000,000; gas services, $1,000,000.

Calif., Los Angeles—PISTOL RANGE—Los Angeles Co. Bd. Superv., 501 Hall of Records, plans by Edward H. Fickett, 7421 Beverly Blvd., Hollywood, pistol range extension, Biscaluz Center, proj. 7442. $190,970. J. A. Lambie, c/o owner, engr.

Calif., Solano—PARK DEVELOPMENT—City, City Hall, Solano and Solano Co., Court House, Vallejo, Cannon Ball Park development, Montecello Dam area. $856,000.

▲ **Calif., Stockton**—DOCK—Stockton Port Comn., c/o Director, Deep Water Docks, Stockton, 900 ft., rein.-con. deep water dock, Port of Stockton. $1,400,000. Tudor Eng. Co., 74 New Montgomery St., San Francisco, consult. engr. CD 1/16.

Conn., Bridgeport—STADIUM—Bridgeport Stadium Com., James H. Halsey, chn. Univ. of Bridgeport, public stadium, $100,000.

Conn., Danbury—HEATING SYSTEM—State Public Works Dpt. 165 Capitol Ave., Hartford, enlarge heating sys., Danbury State Teachers' College, $104,750. CD 1/13/49 under Public Bldgs.

Conn., Hartford—FIRE ALARM CABLE—City, City Hall, replace remainder of fire alarm cable and central alarm facilities. $405,000. Winfred W. De May, city engr.

Conn., New Britain—PLAYGROUND—City, City Hall, playground at Elihu Burritt School, Lee St. $100,000.

▲ **Conn., New London**—PARKING FACILITIES—City, City Hall, parking facilities, storm sewers, sidewalks, public bldg. imprvs. stoker for incinerator plant and rec. construction at Ocean Beach Park, $1,030,000. Charles P. De Biasi, city engr.

Ind., Fort Wayne—RADIO STUDIO—Television Station WIN-T, R. Morris Pierce, mg. dir., radio and television studio and transmitter bldg., W. State Blvd. for Station WIN-T (television) and WANE (radio). $360,000.

Ind., Indianapolis—SWIMMING POOLS, etc.—City Parks Bd. Swimming pools at Arnolda Park, Brookside Park, and Northwestern Park, $675,000; wading pools at Belmont Park, Windsor Village, Oakhill Playground, and Centennial and Groth, $240,000; repair swimming pools at Broad Ripple and Willard Park, $80,000; community building at Holliday Park, $125,000; clubhouse at Riverside Park, $115,000. CD 12/23/48.

Iowa—GAS DISTRIBUTION SYSTEM—Iowa-Illinois Gas & Electric Co., 327 3rd St. S.E., Cedar Rapids, gas distr. system and imprvts. at Cedar Rapids and Marion. $890,000.

▲ **Kansas**—RURAL DISTRIBUTION LINES—Jewell-Mitchell Co-operative Electric Co., Clarence W. Smith, mgr., Mankato, 50 mi. rural distr. lines, 49 mi. 34.5 kv transmission lines, 112 mi. tie lines, 286 mi. existing lines to be converted for higher voltage, Jewell Co. $1,035,000. Raymond H. Reed Co., Columbus, Neb., consult. engr. CD 12/13.

† **Massachusetts**—NIKE SITE—U. S. Eng., 150 Causeway St., Boston, addnl. to Nike Site, Mess hall, barracks, administration bldg., Bedford. $300,000. Tekton Assoc., Inc., 23 Washington St., Natick, consult. engr. Constr. in 1957.

Mass., Provincetown—WHARF—Plymouth Bay Packing Co., Inc., Depot Rd., North Truro, plans by F. Cliff Pearce, Main St., Orleans, wharf and fish receiving station, $100,000. Constr. in 1957.

Nebraska—RURAL DISTRIBUTION LINES—Consumers Public Power Dist., Columbus, rebuild rural distr. lines, Stanton and vicinity, $105,000; distr. extens. and imprvs., Norfolk and vicinity. $100,000. R. L. Schacht, c/o owner, ch. engr.

▲ **New Jersey**—ELECTRIC DISTRIBUTION SYSTEM—Public Service Electric & Gas Co., Park Place, Newark, enlarging and reinforcing electric distr. sys., Trenton, $1,250,000; extension, reinforcement gas distr. sys. in Trenton-Camden area, $5,000,000.

▲† **New Mexico**—TRANSMISSION LINE—Atomic Energy Comn., Albuquerque Operations Office, P. O. Box 5400, Albuquerque, transmission line from Santa Fe to Los Alamos. $1,000,000.

▲ **New Mexico** — TRANSMISSION LINE — New Mexico Public Service Co., 424 Central Ave., Albuquerque, transmission line from Albuquerque to Santa Fe, $2,000,000.

▲ **O., Cleveland**—PARKING LOTS—City, Dpt. Public Safety, John M. McCormich, dir., City Hall, Zone 14, off-street parking lots, in St. Clair-E 105 St. Area, $142,000; off-street parking lots, 8 lots on Broadway, E. 55 St. area for 775 cars, $503,000, Constr. 1958-1959; three off-street parking lots, in Broadview-Memphis-Pearl Rd. area for 429 cars, $291,000, Constr. this year; 4 off-street parking lots around E. 140 St. and Kinsman Rd. for 335-cars, $198,000, Constr. this year; 7 off-street parking lots around E. 116 St. and Buckeye Rds., $250,000. Constr. this year. Robert J. Kelly, c/o owner, city traffic engr. CD 11/5/54.

Tex., Crosbyton—POWER SYSTEM—City, City Hall, c/o C. H. Lodal, mayor. power system extens., imprvs. $131,000.

▲ **Tex., Houston**—DOCKS, etc.—Port Comn., Navigation Dist., 1519 Capitol St., voted bonds Jan. 31, three new docks, $3,900,000; transit sheds $600,000; access roads, $200,000; railway facilities and trackage in port area, $1,750,000; foreign trade center, $500,000. (revenue type) some general port imprvs. $5,000,000. CD 1/30.

Tex., Mesquite—PARKS—City, City Hall, voted bonds Jan. 29, parks, $250,000. CD 1/7.

Washington—SERVICE CENTER, etc.—Wash. Water Power Co., W. 825 Trent St., Spokane, service center, Pullman, $190,000; sub-station, Millwood, $327,000. Work to start this year. CD 1/13, under Idaho and Washington.

Que., Baie Ste. Catherine — WHARF — Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., wharf repairs at Anse au Portage. $210,000.

Que., Paspebiac—WHARF—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., wharf reconstr. $350,000.

Que., Riviere du Loup—WHARF—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., wharf repairs, $200,000.

Que., Sept Iles—WHARF—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., wharf development. $250,000.

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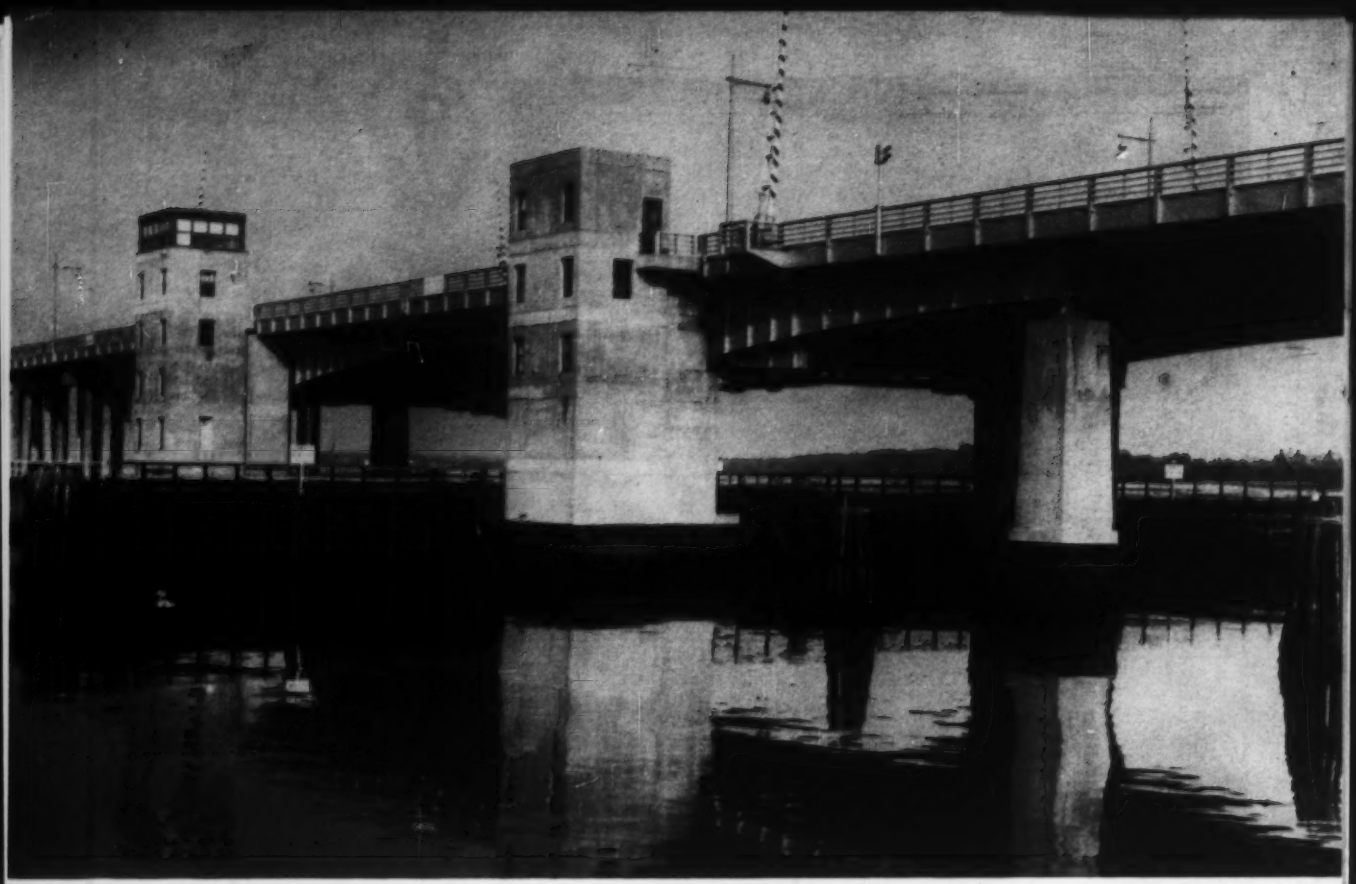
Spread over 150 miles, this fast-moving organization must have expensive equipment at the right spot, at the right minute with minimum outage and standby time. And qualified manpower must be available exactly when and where it is needed to eliminate bottlenecks, speed materials flow, and insure profitable progress on every project.

Solving such problems becomes routine operation with the instant communication and control made available with the G-E Two-Way Radio System. No piece of mobile equipment, no work crew is more than a voice away. Learn how your business can profit from the experience of this progressive construction company and many other forward-looking organizations in scores of industries.

For Sales and Service see "Radio Communication Equipment" in your Yellow Pages. Or, write: *General Electric Company, Communications Equipment, Section C2727-21, Electronics Park, Syracuse, N. Y.* In Canada, write: *C.G.E. Electronics, 181 Lansdowne Avenue, Toronto.*

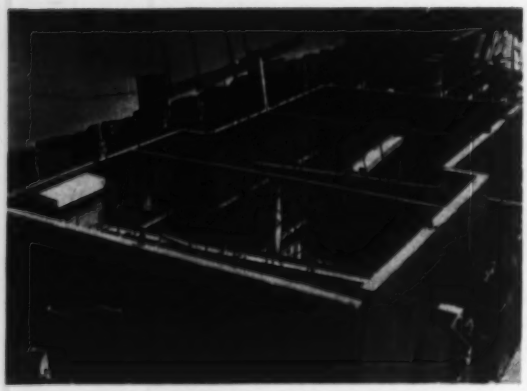
Progress Is Our Most Important Product

GENERAL ELECTRIC



Protective scale which normally forms on the surface of wrought iron plates provides a long life additive for concrete substructures.

Bridge piers get low-cost protection against corrosion and spalling with Wrought Iron Plates



On new installations, wrought iron plates can serve in the place of forms for the concrete during construction.

Wrought iron pier protection plates stand up successfully to submerged and alternating wet-dry corrosion for extremely long periods of time.

The cost of such encasement is low in terms of protection for the concrete or other exposed structures. That's because wrought iron is such a reliable buffer against abrading or cutting action of water, floating objects and freezing and thawing.

We'd like to tell you more about wrought iron's saving in this service. Our booklet, *Wrought Iron for Bridge Construction*, contains illustrated case histories. Write for a copy. A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

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BYERS Wrought Iron Tubular and Hot Rolled Products

ALSO ELECTRIC FURNACE QUALITY STEEL PRODUCTS

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
February 25 Connecticut
STREETS AND ROADS
February 25 Connecticut

▲† **Mass., Chicopee Falls** — OFF-BASE COMMUNICATIONS BLDG.—BA On Or About 3/20—U. S. Eng., 150 Causeway St., Boston, Zone 14, off-base communications bldg., Westover Air Force Base, ENG-19-016-57-165. $1,000,000-$1,250,000. Plans deposit $20.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
February 26 Maryland — February 28 New York
March 5 New Jersey
STREETS AND ROADS

HEAVY CONSTRUCTION—LB & CA

▲† **Greenland Contractors** (Peter Kiewit Sons' Co., Condon-Cunningham, Inc., S. J. Groves & Sons Co., Al Johnson Construction Co.), 538 South Broad St., Trenton, N. J. and **Danish Arctic Contractors**, Copenhagen, Denmark, CA Est. $35,000,000. launching and control sites for guided missiles at Nike Base, northwest coast and Thule Air Force Base, GREENLAND. Eastern Ocean Div., North Atlantic District, U. S. Eng., 346 Broadway, New York, N. Y.

▲ **NEW YORK**—John W. Johnson, supt. Dpt. P. Wks., The Gov. Alfred E. Smith State Office Bldg., Albany,
Grandview Constr. Corp., 740 Fulton Ave., Mount Vernon, N. Y. CA $3,904,979, est. $4,802,000 (8 bidders) constr. four-lane divided east approach to Berkshire Thruway Bridge over Hudson River, starting about 1,200 ft. west of Rte. 9 and extending westward to bridge side, 5.25 mi., Rensselaer Co. CD 12/21, under LB.

▲ **NEW YORK**—John W. Johnson, supt. State Dpt. P. Wks., The Gov. Alfred E. Smith State Office Bldg., Albany,
N. Y.—**Gull Contg. Co., Inc.**, 33-15 Lawrence St., Flushing, N. Y. CA $6,273,623, est. $6,277,000. (2 bidders) constr. 1.45 mi. sect. of six-lane divided Horace Harding Expressway (Rte. 25D) between Parsons Blvd. and 192 St., incl. constr. 3.72 mi. access and service roads, constr. pedestrian overpasses at 159 St. and Fresh Meadow Lane and building grade separation structures at 164 St. Utopia Parkway and 188 St., Queens Co.;
N. Y.—**Johnson, Drake & Piper, Inc.**, 86 Trinity Pl., New York 6, N. Y. CA $3,538,512, est. $3,750,000 (4 bidders) constr. 0.21 mi. elevated portion of State Thruway's Niagara Sect. and 0.11 mi. access ramps between Washington and Franklin Sts., in Buffalo, Erie Co.; CA $7,295,718, est. $7,359,000 (2 bidders) constr. 1.36 mi. six-lane divided segment of State Thruway's Niagara Sect. between Clinton and Peabody Sts. in Buffalo, incl. 0.78 mi. access roads and structures to carry Thruway over Bailey Ave., Seneca, Milton, Babcock and Peabody Sts. and Pennsylvania and D. L. & W. Railroads, Erie Co. Grand total $17,107,853. CD 12/7, under LB.

▲ **NEW YORK**—John W. Johnson, supt. Dpt. P. Wks., The Gov. Alfred E. Smith State Office Bldg., Albany,
N. Y.—**Del Balso Constr. Corp., & Musciano Constr. Corp.** (joint venture), 20 Pelham Parkway, Pelham Manor, N. Y. CA $13,572,857, est. $12,576,000 (1 bidder) constr. 4.26 mi. six-lane divided White Plains sect. of Cross-Westchester Expressway and 10.52 mi. of access and service roads from vicinity of Hillside Ave., Rte. 119 intersection in Greenburgh, incl. building of 22 structures ranging from 30 ft. long culverts to 19 span, 1,293 ft. long viaduct over Bronx River Parkway, Bronx River and Harlem Division of the New York Central R.R., Westchester Co.;
N. Y.—**Union Building & Constr. Corp.**, 631 Main St., Passaic, N. J. CA $7,103,967, est. $8,569,000 (7 bidders) constr. 7.5 mi. sect. of four-lane divided Berkshire Thruway and 5.87 mi. access and service roads, incl. constr. grade separation structures to carry Plast Rd., Red Rock Rd., Rte. 22 and Rte. 102 over the Thruway and bridges to carry the Thruway Red Rock Rd. and Frisbee St. over Frisbee Creek, Columbia Co.;
N. Y.—**Johnson, Drake & Piper, Inc.**, 86 Trinity Pl., New York, N. Y. CA $3,836,950, est. $4,150,000 (4 bidders) constr. 1.41 mi. six-lane divided portion of State Thruway's Niagara Sect., incl. 2.27 mi. of access roads and building of three grade separation structures, Erie Co.;
N. Y.—**Hendrickson Bros., Inc.**, 63 North Central Ave., Valley Stream, N. Y. CA $2,823,320, est. $2,846,000 (1 bidder) constr. Merrick Rd. traffic interchange on Conduit Blvd. (Rte. 27) between Ocean and Lincoln Aves. on western edge of Rockville Centre, incl. 0.62 mi. of work on Merrick Rd. and various access ramps, two hy. grade separation structures, pedestrian bridge and one stream bridge, Nassau Co.;
N. Y.—**DeLillo Constr. Co.**, 200 Old County Rd., Hicksville, N. Y. CA $1,545,617, est. $1,690,000 (5 bidders) reconstr. imprvs. along 2.89 mi. sect. of Middle Rock Rd. (Rte. 101) from North Hempstead Turnpike (Rte. 25A) northward toward Sands Point to Delaware Ave., Nassau Co.;
N. Y.—**Bero Constr. Corp.**, 259 Delaware Ave., Buffalo, N. Y. CA $1,194,729, est. $1,339,000 (2 bidders) constr. 2.51 mi. sect. of River Rd. arterial route in North Tonawanda, Niagara Co.; CA $1,114,410, est. $1,168,000, constr. 3.51 mi. sect. of East-West arterial route (Rte. 3) in Fulton, Oswego Co. Grand total $31,191,850. CD 12/21, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office Bldg., Harrisburg,
Pa.—**S. J. Groves & Sons Co.**, Box 85, Woodbridge, N. J. LB $2,932,088. (5 bidders) constr. 20,018 ft. rein.-con. road two I-beam bridges city of Allentown, Salisbury and Upper Saucon Twps., T. R. 309, Lehigh Co.;
Pa.—**Harry C. Erb, Inc.**, 29 Bala Ave., Bala, Pa. LB $1,658,641. (5 bidders) wid'n. 22,783 ft. existing road with c. conc., bit. surf. Upper Darby, Nether Providence and Springfield Twps., Media, Morton, Swarthmore and Clifton Heights Boros, T. R. U. S. 1, Delaware Co.;
Pa.—**Stabler Constr. Co.**, Lucknow Lane, Harrisburg, Pa. LB $1,189,477. (3 bidders) constr. 38,369 ft. crushed aggregate base with bit. surf. 5 bridges, Fell, Greenfield, and Clifford Twps., Carbondale City, T. R. U. S. 106, Lackawanna and Susquehanna Counties;
Pa.—**Wagner Constr. Co.**, 115 S. Wyoming Ave., Kingston, Pa. LB $208,898. (4 bidders) constr. 4,698 ft. crushed aggregate base with bit. surf. Forty Fort and Wyoming Boros, T. R. 11, Luzerne Co. Bids Feb. 8. CD 1/16.

BUILDINGS—LB & CA

▲ **U. S. Eng.**, 24 St. and Maryland Ave., Baltimore 18, Md., rejected bids Feb. 5, construct and finance 1,000 HOUSING UNITS, (Capehart), ENG-18-020-57-21, FORT GEORGE G. MEADE, MD. LB $14,812,800. CD 2/8, under LB.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
February 27 Louisiana, Virginia
STREETS AND ROADS
February 27 Louisiana, Virginia

HEAVY CONSTRUCTION—LB & CA

▲ **VIRGINIA**—The Richmond-Petersburg Turnpike Auth., 1015 E. Main St. or by mail at P. O. Box 1-R, Richmond, Zone 2,
Wright Contg. Co., P. O. Box 38, Odenton, Md., LB $2,995,063 (4 bidders) Contract C-3-G; Section C, grading, drainage, paving, structures from point 100 ft. north of Ruffin Rd. to the James River Bridge, City of Richmond. Bids Jan. 24. CD 1/16.

BUILDINGS—LB & CA

▲ **Daniel Constr. Co.**, Insurance Bldg., Richmond, Va., CA TEXTILE FIBRE PLANT, LEE HALL, VA. Dow Chemical Co., Midland, Mich. H. K. Ferguson Co., 1783 E. 11 St., Cleveland, O., engr. CD 1/15/52;
Wray & Richardson, 314 W. Pembroke Ave. Hampton, Va., CA, grading and site preparation. (Lee Hall, Va.).

▲† **Virginia Engineering Co., Inc.**, 80 29 St., Newport News, Va. LB $2,637,000. (6 bidders) enlisted men's and enlisted wavs' BARRACKS, Naval Station, U. S. Naval Base, NBy 7690, Spec. 7690/56, NORFOLK, VA. Dist. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk, Va. Bids Feb. 12. CD 1/9.

▲ **One Bal Harbour, Inc.**, Melvin G. Rubel, pres., c/o Norman Giller & Assocs., archts., 420 Lincoln Rd., Miami Beach, Fla. Owner Builds. $7,000,000. 17 story "Rubaiyat HOTEL" and two swimming pools, 96 St. and Collins Ave., BAL HARBOUR, FLA. CD 12/13.

▲ **E. I. duPont de Nemours & Co. Inc.**, duPont and Nemours Bldgs., Wilmington 98, Del., Own Forces, $8,000,000. TITANIUM DIOXIDE PLANT, near NEW JOHNSONVILLE, TENN.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
March 5 Ohio — March 6 Michigan

HEAVY CONSTRUCTION—LB & CA

▲ **ILLINOIS**—Illinois State Toll Hy. Comn., 20 N. Wacker Dr., Chicago,
M. J. Boyle Co., 2480 Elston Ave., Chicago, Ill. and **Ryan Constr. Co.**, 800 E. Michigan St., Evansville, Ind., LB $7,662,340. Contr. T-7-A, grading, drainage, paving, precast concrete, steel bridges 4.75 mi. N. of Rte. 20, Mt. Prospect Cook Co. Bids Feb. 7. CD 1/22.

▲ **M. J. McDermott & Co.**, 30 N. La Salle St., Chicago, Ill. and **Contracting & Material Co.**, 1235 Dodge St., Evanston, Ill., LB $3,678,970. 15 station buildings for Rapid Transit System operating in median strip of Congress Expressway between S. Lavergne Ave. and Halsted St., CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids Feb. 7. CD 1/21.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
February 28 Kansas — March 26 South Dakota
STREETS AND ROADS
February 28 Kansas

▲† **Tex., San Antonio**—BUILDINGS—BA About 3/27—U. S. Eng., P. O. Box 282, Building 60, Kelly Air Force Base, addnl. buildings incl. (a) 4 story, rein.-con. frame 105,108 sq. ft. building (b) 1 story, 28,506 sq. ft. rein.-con. frame building (c) heating and cooling plant to serve entire School of Aviation Medicine (d) buildings to be supported on concrete drilled footings basements and first floors will be suspended type utilizing pan joist constr. (e) utility connections for buildings, grading, paving, drainage for the "Ramp Drive", School of Aviation Medicine, ENG 41-243-57-30. $3,000,000-$5,000,000. CD 7/28/53.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
March 1 Oregon
STREETS AND ROADS
March 1 Oregon — March 13, 14 California

BUILDINGS—BA

▲ **Ore., Salem**—SCHOOLS—BA 3/15—Salem School Dist., 1309 Ferry St., 2 Junior High Schools. $2,500,000. William I. Williams, 1390 N. Capitol St., archt. CD 12/18, under LB.

BUILDINGS—SLC

▲ **Calif., Fresno**—MOTEL—Joseph F. Dolin, Fresno, and B. M. Olden, 2305 Santa Monica Blvd., Santa Monica, soon lets contract stone and glass Flamingo Motel, incl. swimming pool, etc. $2,000,000. Richard L. Darman & Assocs., 221 N. Robertson Blvd., Beverly Hills, archts. CD 12/19.

BUILDINGS—LB & CA

▲ **Louis C. Dunn**, 1800 Evans Ave., San Francisco, Calif., LB Approx. $2,500,000. 3 story WAREHOUSES and OFFICES, SAN FRANCISCO, CALIF. Eastman Kodak Co., 241 Battery St., San Francisco, Calif. Bids Jan. 31. CD 1/23.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
February 20 British Columbia

BUILDINGS—BA

▲ **Man., Winnipeg**—OFFICE—BA 3/12—Great West Life Assurance Co., Lombard St., 5 story, bsmt., penthouse, 320,000 sq. ft. rein.-con., structural steel frame, stone facing office bldg. $10,000,000. Marani & Morris, 1250 Bay St., Toronto, Ont., archts. Moody & Moore, 295 Broadway Ave., assoc. archts. Wallace, Carruthers & Assocs. Ltd., 92 Yorkville Ave., Toronto, Ont., engrs. CD 7/6.

BUILDINGS—LB & CA

▲ **E. G. M. Cape & Co.**, 4898 Western Ave., Montreal, Que., Est. $15,000,000. 3 year PLANT EXPANSION program, incl. 3 story administration bldg., large freight car erection shop exten., new freight and passenger cars mfg. building, trucks and sheet metal fabrication machining, large storage bldg., etc., MONTREAL, QUE. Canadian Car & Foundry Co. Ltd., 621 Craig St. W., Montreal, Que. Awarded Feb. 7.

ALASKA

HEAVY CONSTRUCTION—BA

▲† **Alaska**—STORAGE FACILITIES—BA 2/26—U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash., ammunition storage facilities, Ladd Air Force Base, Inv. 57-37. $2,500,000. CD 12/19, under LB.

▲† **Alaska**—MISSILE INSTALLATION—BA 3/26—U. S. Eng., 4735 E. Marginal Way, Seattle 4, Wash., three guided missile installation near Elmendorf Air Force Base, Inv. 57-30. $7,500,000. CD 8/22/55.

AMERICANS ABROAD

HEAVY CONSTRUCTION—LB & CA

▲ **Utah Constr. Co.**, 100 Bush St., San Francisco, Calif., U. S. A., CA $30,500,000. dam and hydro electric plant on Karnafuli River, PAKISTAN. Govt. of Pakistan, Karachi, Pakistan. CD 7/10.

(Proposal Advertisement see pp. 301 to 303)

FROM COAST TO COAST

RAYMOND

For our new brochure, showing how Raymond can help you and the National Highway Program, write Dept. E-3, Raymond Concrete Pile Co., 140 Cedar St., N. Y. 6, N. Y.

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. . . COMPLETE CONSTRUCTION SERVICES ABROAD.

Here are a few of the structures that rest on Raymond foundations. These buildings represent an impressive testimony to the over half a century of confidence placed in us by the architects, engineers, contractors and business executives of this country.

If you're contemplating any type of construction—large or small, we'll be happy to discuss your foundation problems with you.

. THE FINEST STRUCTURES REST ON

FOUNDATIONS

RAYMOND CONCRETE PILE CO.

AROUND THE WORLD FOUNDED 1897

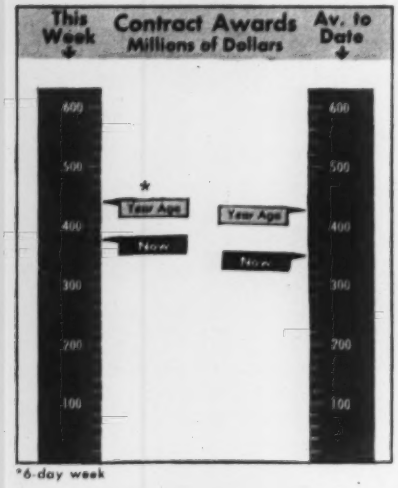
140 Cedar Street, New York 6, N. Y.

OUR 60th YEAR

BRANCH OFFICES in Principal Cities of the United States, Canada, Central and South America

Construction Scoreboard

Activity this Week



*6-day week

AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 8 wks 1957	Chge %
	millions		
Federal	$51.0	$326.5	+3
State and Municipal	162.9	1,065.7	+13
Total Public	213.9	1,392.2	+10
Total Private	160.8	1,386.3	−34
U. S. Total	$374.7	$2,778.5	−18
By Type of Work			
Waterworks	$6.6	$52.7	+17
Sewerage	2.5	65.5	−52
Bridges	5.5	92.6	+5
Highways	106.8	450.1	+48
Earthwork, Waterways	41.1	187.2	+77
Buildings:			
Public, Excl. Housing	42.3	329.6	+10
Public Housing	0.5	42.1	−42
Private Housing	42.8	460.2	−54
Commercial	48.8	151.5	−61
Industrial	65.7	630.2	−1
Unclassified	12.1	316.8	+4
U. S. Total	$374.7	$2,778.5	−18

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

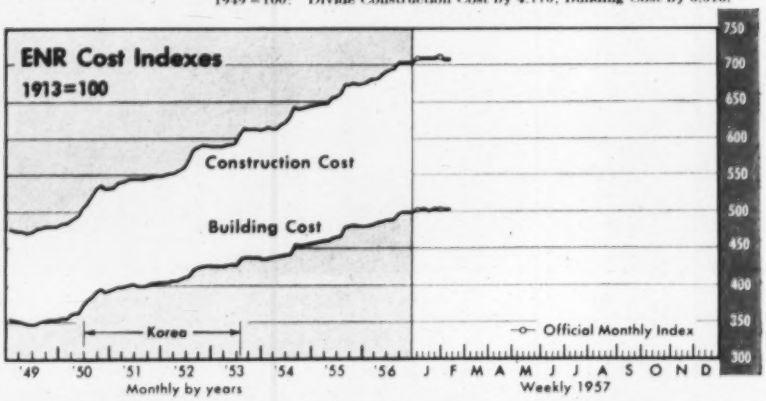
NEW CAPITAL FOR CONSTRUCTION

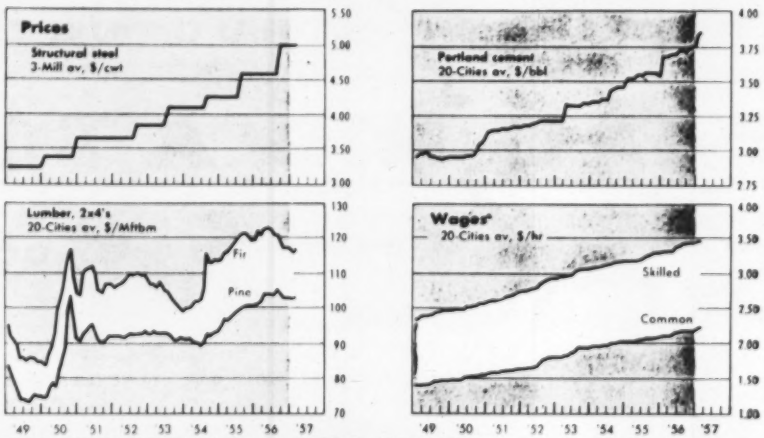
	Week of Feb. 14	Cum. 7 wks 1957	Chge '56-'57 %
	millions		
Corporate Securities	$54.1	$754.3	+149
State and Municipal:			
All Except Housing	110.4	705.8	+44
Housing	...	....	−100
Federal Loans	3.1	16.2	+31
Federal Aid	...	....	...
Total Nonfederal	$167.6	$1,476.3	+79
Federal Appropriations:			
In U. S.	...	....	...
Outside U. S.	...	....	...
Total New Capital	$167.6	$1,476.3	+79

Cost Indexes as of Now

ENR INDEXES (1913 = 100), 20-cities' average	Week of Feb. 14 1957	% Change from Jan. 17, 1957	% Change from Feb. 16, 1956
Construction Cost	708.88	+0.01	+4.2
Building Cost	501.61	−0.2	+3.9

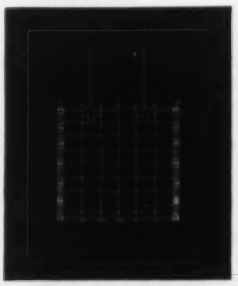
To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

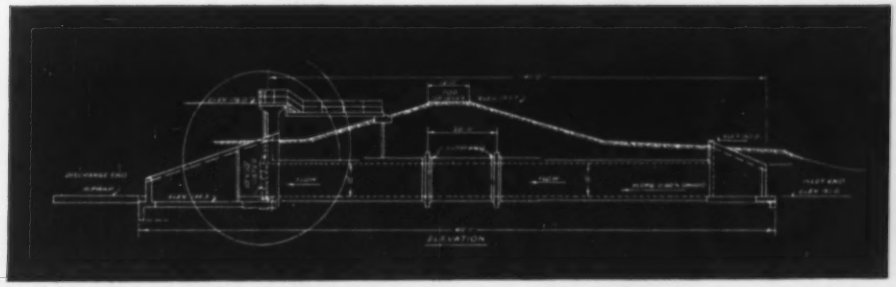


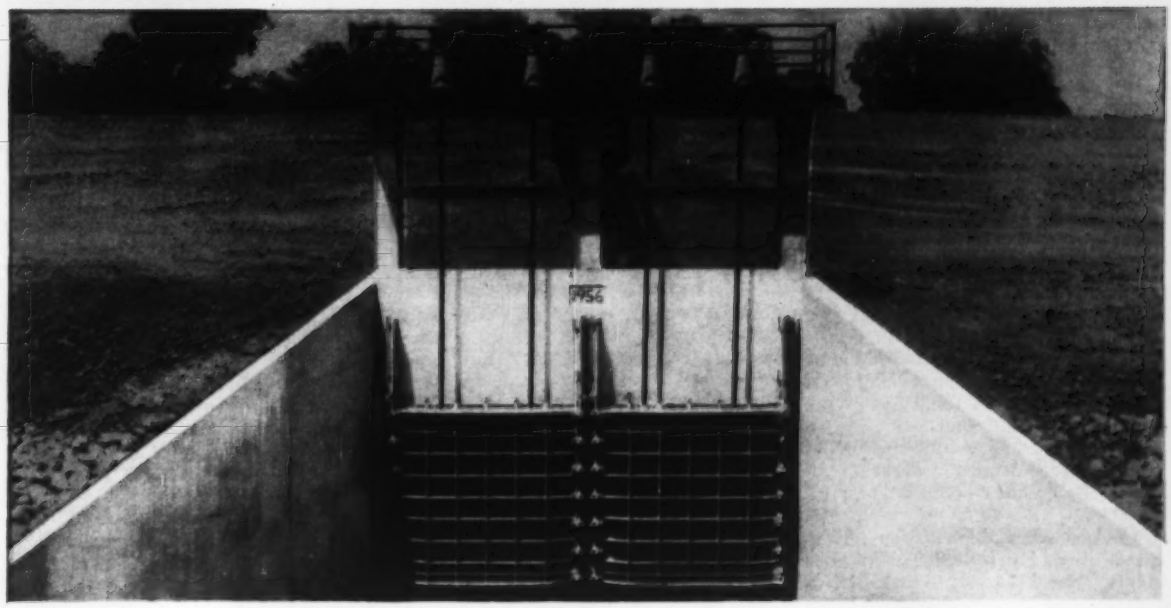


ENR COST INDEXES IN 22 CITIES, 1913 = 100

City	Construction Cost Feb. 1957	Construction Cost Percent Change from last Month	Construction Cost Percent Change from last Year	Building Cost Feb. 1957	Building Cost Percent Change from last Month	Building Cost Percent Change from last Year
Atlanta	523	0	+4.2	442	0	+4.2
Baltimore	642	0	+8.6	499	0	+5.7
Birmingham	554	0	+1.5	456	0	+2.8
Boston	749	0	+4.8	511	0	+3.7
Chicago	790	0	+2.8	506	0	+2.6
Cincinnati	714	+0.5	+6.0	490	+0.7	+4.4
Cleveland	820	0	+4.8	509	0	+4.5
Dallas	534	+0.2	+4.4	449	+0.3	+5.0
Denver	697	+0.1	+6.4	523	+0.1	+7.7
Detroit	809	0	+4.2	528	0	+4.8
Kansas City	717	+0.1	+1.5	507	+0.5	+1.6
Los Angeles	737	+0.7	+2.5	499	+1.1	+1.9
Minneapolis	758	0	+5.2	527	0	+4.8
New Orleans	565	+0.1	+2.9	465	+0.2	+2.3
New York	853	+0.3	+4.9	579	+0.4	+5.1
Philadelphia	749	0	+3.8	556	0	+3.7
Pittsburgh	762	+3.7	+10.7	541	0	+8.2
St. Louis	760	0	+0.4	529	0	+1.0
San Francisco	723	−0.2	+4.6	490	−0.2	+4.3
Seattle	746	+0.8	+4.2	448	−0.5	+2.0
U. S.—20 Cities' avg.	710	+0.3	+1.4	503	+0.1	+4.0
Montreal	560	−0.2	+1.8	437	−0.2	+2.3
Toronto	594	−1.2	+6.9	460	−1.6	+3.8







Makes the Bayou behave

Water control engineering problems are unique in their profound effect upon human lives, health and prosperity.

In this installation, Rodney Hunt engineering and sluice gate design protect more than 80 square miles of farm land. The gates, when open, allow normal drainage to the Bayou River, and when closed prevent flooding as the river goes to flood stage.

The two Rodney Hunt 10-foot by 10-foot cast iron bronze-mounted sluice gates were designed for maximum opening with minimum structure. The installation is unique because inherently rigid flange frame sluice gates with wall thimbles were installed with attaching studs projecting to the front of the frame. This eliminated the need for excessive side clearance and saved on structural costs. Rodney Hunt also supplied precision-built interconnecting floor stands with twin stems on each gate for balanced, smooth operation.

Projects of such importance demand skilled engineering as well as unquestioned product dependability.

RODNEY HUNT MACHINE CO.

Water Control Equipment Division

95 Lake Street, Orange, Massachusetts, U.S.A.

RODNEY HUNT®

SERVING WATER CONTROL ENGINEERS WITH SLUICE GATES AND ENGINEERING

The Longer Look:

Housing Gets Less of Consumer Dollar

Residential construction has been getting a steadily smaller share of the consumer dollar and has become steadily less important in the nation's capital investment, despite the greatest homebuilding boom in history during the years since World War II. And, there doesn't seem to be a very good chance that this trend will be reversed soon.

Furthermore, though new houses have become more expensive almost every year, the average real value of new houses (in 1929 prices) is much less than it used to be.

The average real expenditure on new dwelling units built in the late 1920s was almost $6,000. In the last few years, the expenditure, in 1929 prices, has been running only about $4,000 per new private dwelling unit.

These conclusions, which splash cold water on many popular conceptions of the postwar building boom, highlight a monumental new study of residential construction—Capital Formation in Residential Real Estate—written by Leo Grebler, David M. Blank and Louis Winnick and published by Princeton University Press for the National Bureau of Economic Research.

This new book, which will be a standard reference for students of homebuilding and real estate for years to come, analyzes trends and cycles in residential construction since 1889 and also prospects for the years 1955-75.

Several reasons are given for the reduction in the average investment, in real terms, going into the new houses:

- The increasing share of homebuilding going on in the West and South, where the mild climate requires less substantial houses.
- The larger share of homebuilding in rural nonfarm areas, where average expenditure per unit is low.
- Decline in average size of families and households, with married children and older relatives maintaining separate homes.
- Tendency toward lighter materials and construction.
- Higher increase in prices of construction relative to other prices, which makes people try to economize on housing expenditures.
- Possibly, more people from lower rungs of the economic ladder buy new houses now than formerly.

On the other hand, there have been factors tending to draw more money into housing: the addition of garages, heating systems, closets and kitchen equipment, the growing proportion of single family houses, and the rise in real income.

The authors caution against any conclusion that consumers are getting less satisfaction from new houses though, even if the houses represent a smaller investment in real terms.

More efficient construction techniques, for example, need not result in lower quality. Also, better design and more efficient space arrangements make for more comfortable living. And, some of the money that might otherwise have gone to construction now goes into appliances and other household equipment.

What prospect is there that these trends will be reversed and consumers will put more money into housing? The authors do not give any definite forecasts, but they do suggest several factors that might give a new boost to homebuilding over the next 20 years.

Migration. There is likely to be continued movement of city families to the suburbs. Where this isn't matched by movement of other families into the cities, as from farms, it means a net increase in demand for homes.

Second homes. The authors suggest that with rising incomes "the traditional notion of a maximum of one dwelling unit per nonfarm household may have to be revised." Summer and weekend homes have become increasingly popular among upper income families, and the idea may filter down as more people can afford vacation cottages.

Age of homes. The increasing age of our stock of housing might cause an increase in demolitions. But the authors point out that, relative to other countries, the U. S. still has a low average age for its dwelling units.

Renewed interest in homes. There is also the possibility that consumers' tastes may change, so that they will take more interest in new and more

Uranium Plants Create New Steel Market

Uranium development in the Blind River region of northern Ontario, Canada, is creating a good market for steel. One fabricator, Dominion Bridge, has shipped some 15,000 tons of fabricated structurals into the area for four uranium processing facilities, including the Nordic Algom plant shown above.

expensive homes. This could be stimulated by product innovation.

"Larger numbers of households might trade old for new units if the latter were vastly superior in design, style, location, or quality." The authors suggest that a "replacement market" might be developed in housing, as for other durable goods.

"As home ownership and leisure increase, the old adage that a man's home is his castle may come closer to realization." But it will take a dramatic turn for even this factor to reverse the trend of 60 years and draw a bigger share of the consumer's dollar into housing.

Ontario Will Prequalify Roadbuilding Contractors

Prequalification of roadbuilding contractors is to be instituted shortly by the Ontario Department of Highways. Contractors were advised to apply for pre-qualification to the department before the end of January.

The new system will apply to all those bidding on grading contracts above $200,000, paving jobs above $150,000, grading and paving contracts above $300,000 and structure contracts above $100,000. In 1956 Ontario spent $100 million on highways.

Prequalification was recommended by the management firm of J. D. Woods & Gordon, in a recent report on the operation of the Highway Department.

W. M. Philpott of the Ontario Road Builders Association said that the industry welcomed the move. The new system assures that the contractor can complete the job and gives the department control over the performance of successful bidders.

$21 Million Bond Issue Approved for Port Work

The South Carolina general assembly has enacted the third largest bond issue measure in the state's history—a $21 million effort—to pay for expansion of state port facilities at Beaufort, Charleston and Georgetown.

The program to be paid for by the bond issue, strongly supported by Gov. George Timmerman, is expected to triple port revenues within the next five years.

Expansions planned for the three ports will include six new general cargo berths, a new banana pier, five 90,000 sq ft transit sheds, two 135,000 sq ft warehouses and incidental dredging.

(*B&F continued on page 292*)

Construction Markets

Little Rock: An On-the-Spot Report

"The construction outlook for the Little Rock area looks pretty dog-gone good for the next few months, and we aren't too worried about the tight money market."

That prediction, advanced by an official of the Arkansas Home Builders Association, sums up the feelings of most contractors, architects, engineers and bankers in Little Rock, Ark.

Some believe the money situation will slow building down a bit during the early part of the year, but nearly all agree that 1957 should be as good as and possibly better than 1956.

Building permits in Little Rock and North Little Rock dropped from $17.8 million in 1955 to $15.5 million last year. But the big dollar value of home construction was occurring outside the city limits and therefore wasn't included in the figures.

The Little Rock industrial district, a 600-acre tract, also is located outside the city limits. It is fast becoming one of the major industrial sections of the city.

Architect Howard Eichenbaum is one of those who believes construction this year will at least equal the 1956 total. He has four jobs pending and up for bids with a total value of about $1 million.

Homebuilder Elbert L. Fausett is another optimist, although he believes that "financing might be a little tight during the first quarter of 1957."

But Fausett says he expects to build 200 homes this year.

In downtown Little Rock, plans are being made for a five-story parking building and the J. C. Penney Co. has started a new store. A new $700,000 surgical wing will be added to Arkansas Baptist Hospital.

On the public works scene the picture is bright.

Biggest job in the mill is the third bridge and expressway program which will cost about $28 million. Designed to improve the east-west traffic flow at Little Rock, the project's approximate location has been mapped and appraisal of right-of-way has started.

Construction of the new $3.2 million Riverfront Drive is about half completed and the project may be finished in about 18 months. Although it was started before the expressway program was devised, the Riverfront Drive project is designed to fit into the over-all thoroughfare plan.

A $4 million sewer improvement program has been approved by Little Rock voters, but contracts for it have not been awarded. It will consist of a $2 million sewage treatment plant and $2 million worth of new lines.

Two big federal projects are on tap at Little Rock. They are $16.7 million jobs for housing units at Little Rock Air Force Base and a $9.1 million federal building. The Air Force Base program should begin some time in March but the contract for the government structure has not been awarded because the site has not been selected.

An $8.7 million waterworks improvement program, which includes a new dam and filter plant, is under way and the dam is slated for completion this month.

The expressway program will touch off a large industrial building program. It will necessitate the relocation of 27 wholesale firms in East Little Rock. Eight of these firms already have taken options on land in the industrial district.

School construction at Little Rock is slated for a boost in 1957 since officials plan to build three new 12 room elementary buildings and to add twelve classrooms to existing buildings.

The shortage of structural steel and cement will not seriously deter construction in Little Rock. Materials suppliers do not believe that this shortage is acute.

Insofar as the industrial district is concerned, the outlook is rosy. The Industrial Development Co., which developed the tract, has invested more than $500,000 and has been able to borrow $300,000 from three Little Rock insurance companies to acquire more property.

Like homebuilders in many other cities, those in the field at Little Rock feel that starts early in 1957 will be lower than they were the year before. But they are pinning their hopes for the future on easier credit.

GULF products keep equipment rolling on

Under construction for Duke Power Company's new plant near Belmont, N. C., is a drainage canal to carry hot water from the plant to the south fork of Catawba River. Sixty-three hundred feet long, this drainage canal is a 2,200,000-yard *uphill* earth-moving job. Total excavating and grading on the project amounts to 3,800,000 yards.

Grannis & Sloane, Inc., of Fayetteville, N. C., are the contractors. With a fleet of 11 scrapers they move 13,000 to 18,000 yards per day, most of it on a 5 per cent *uphill* grade. On this tough job, Grannis & Sloane are using Gulf petroleum products exclusively. They know that Gulf quality lubricants protect against mechanical delays, while Gulf fuels insure top engine perform-

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Contract Dispute Brewing

Second low bidder threatens court action on $9.8 million award for state office building in Baltimore

The Maryland Attorney General's office last week turned down a request from Victor Frenkil, president of Baltimore Contractors, Inc., to examine the records of a Jan. 31 contract award of $9,754,885 to Blake Construction Co., of Washington, D. C., for construction of a new state office building in Baltimore.

Frenkil's firm was second low bidder for the job.

Frenkil has threatened court action to invalidate the award, alleging that "sweeping changes" have been made in the contract since the Jan. 31 letting. But, Frenkil previously had stated that he would have to examine state records before he could bring legal action.

The Attorney General's office has countered that it is not unusual for "specifications and general conditions" of the contract to be changed as a project proceeds.

Stedman Prescott, Jr., deputy attorney general, denied that a different contract now is being negotiated between the Maryland Department of Public Improvements and Blake Construction Co., which was given the contract.

"Mr. Frenkil has no right to enter these discussions now," Prescott said. "There is nothing for him to look at."

The Attorney General's office takes the position that it is proper for the state and Blake to negotiate privately in efforts to cut the cost of the project, because all agreements reached will be put on the record when the State Board of Public Works meets.

• **Bids over estimate**—At the root of the present controversy is the fact that when bids for the state office building were opened in December 1956 the lowest of the five bids was more than $1 million higher than the engineers' estimates—and about $1 million more than the legislature had appropriated for the project.

In this situation, the state administration faced three choices it could:

• Go ahead with construction of the main 21 story building, for which Blake bid $9,986,000, and defer construction of a 6 story State Roads Commission structure included in the overall project.

• Make design changes to cut costs to the level of the appropriated funds.

• Ask the Maryland General Assembly to appropriate more money.

Faced with these alternatives, the administration first explored the possibility of design changes. However, to switch to reinforced concrete construction would have made the changes extensive and this was ruled out.

Finally, the decision was made to go ahead with the entire project, with some minor design changes. State officials directed James J. O'Donnell, Director of Public Improvements to discuss these design changes with the apparent low bidder, Blake Construction, to negotiate, but not to commit the state on any design alterations.

After some preliminary negotiations, the contract was awarded to Blake. It is the alleged change in the contract specifications that serves as the basis for the threatened litigation by Baltimore Contractors.

• **The cost squeeze**—Why did the low bid submitted by Blake run so far over the state's estimates? Rising construction costs caught the blame.

The Maryland Department of Public Works noted that rising steel prices were important in the cost picture.

When the state estimated the cost of the state office building at $11.5 million in January 1956, it figured that the 4,000 tons of steel needed would cost $295 a ton erected. Just before the mid 1956 steel strike, the department asked for bids on the steel to forestall delivery delays. Lowest bid received was $420 a ton, which meant that steel alone would run $500,000 above estimates. And, the department rejected those bids.

The December 1956 construction bids were inflated no doubt by the June to December increase in steel prices—above the $420 a ton figure quoted in mid-year.

Equipment Makers Grow More Optimistic

Some construction equipment manufacturers have become much more optimistic about their sales outlook for 1957 since November.

At that time, they were looking forward to an 8% rise in new orders during the first nine months of 1957, as against the same period in 1956. But, the latest new orders forecast of the McGraw-Hill Department of Economics shows that equipment makers now are looking for a thumping 26% jump in orders for the entire year 1957 over the 1956 figures.

This is based on individual order forecasts reported by a sample of the construction equipment manufacturing industry.

If orders live up to these latest expectations, it would mean that equipment purchases would rise much more than the 10% forecast by CONSTRUCTION METHODS AND EQUIPMENT, a McGraw-Hill publication.

This forecast of 10% was based partly on the New Orders Index forecast made last November (see page 68) before last week's forecast was available.

Both forecasts imply a new record in construction equipment shipments this year, but the difference in dollars is considerable.

A 10% rise would mean a dollar value of 175 shipments of $1.15 billion. A 26% jump would push the total dollar value up to $2.5 billion.

A 26% increase in dollar value of construction equipment orders this year becomes an especially high target when you consider that shipments have increased sharply during each of the last two years—32% in 1954-55 and 30% in 1955-56, according to the CM&E Index of Domestic Shipments. Even though prices account for one-fourth of the total rise in each of the last two years, the increase in shipments measured in constant prices has amounted to about 45% during the last two years.

Because contractors' capacity for new highway work is greater than the record volume of new work that has been coming along, its possible that equipment manufacturers may be counting too heavily on the new highway program to give sales a big lift.

Furthermore, a check of several manufacturers two weeks ago indicated that several look for a sales rise of about 10% this year. Only a couple of the 11 firms reporting expect to have a bigger rise.

Significantly, orders during the last six months of 1956 did not measure up to earlier forecasts of what they would be.

On the other hand, forecasts for the first six months of this year are 18% larger than the November forecast, according to the New Orders Index. This could indicate that manufacturers figure that the highway program was off to a slower start than expected, but that it will start rolling during the first half of this year.

(*Continued on page 294*)

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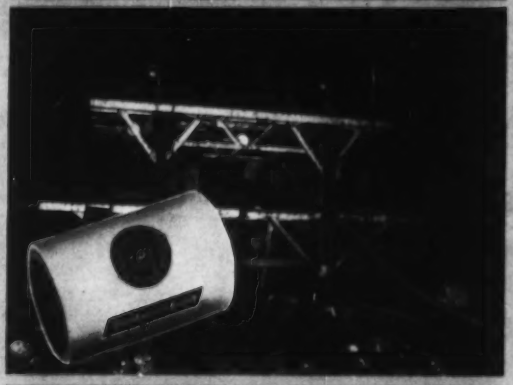

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Money Too Tight?

Current credit policies necessary, banker says

Two recurrent questions, "Is credit too scarce?" and "Are interest rates too high?" are answered with a strong "No" by Carl E. Allen, president of the Federal Reserve Bank of Chicago.

"Let's summarize the present situation in which some say that money is too scarce and too costly," Allen says.

- Employment is and has been at a record peak for some time.
- Many of our basic industries are and have been producing at full capacity and some beyond rated capacity.
- Wholesale prices of industrial commodities are averaging more than 8% higher than in mid-1955.
- Consumer prices rose by nearly 2.5% in a year.
- An old-fashioned capital goods boom is putting a severe strain on savings.

"For some months now," Allen said, "the demand for credit to finance industrial and commercial plant and equipment expenditures, inventories, public works and housing has exceeded the available supply of savings. A very large proportion of this demand was met in 1956 as witness the increase in over-all debt of more than $30 billion. Included in that figure is $5.5 billion more of loans by banks to business, $5.5 billion more in new corporate debt issues, almost $3 billion to consumers, over $10 billion more in residential mortgages, and $4 billion more to state and local governments. Nevertheless, there is no doubt that some businesses, individuals and governments have had to postpone expansion plans."

These expansion plans would have to be postponed in today's market unless the government resorted to inflationary policies, Allen feels.

The banker also denied that the Federal Reserve's tight money policy is unduly restricting small business, public works at local level or homebuilders.

He strongly suggested that state and local governments raise the maximum legal interest that they can pay on public works issues.

Allen said that small business has obtained nearly 50% of the additional corporate loans in 1956 and that homebuilders are operating at such a high level that no help is needed on that score, even though housing volume is below the 1955 level.

Allen's views closely paralleled those voiced before Congressional committees by William McChesney Martin, Chairman of the Federal Reserve Board.

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Sizeable Pay Hikes Are Coming

AFL-CIO indicates 1957 wage boosts will hit 6 to 10 cents an hour plus necessary cost-of-living adjustments

The AFL-CIO's Department of Research predicts that collective bargaining negotiations this year generally will result in wage increases of at least 6 to 10 cents an hour, plus increases equivalent to any upward swing in the cost of living.

Its conclusion is based on the probable influence of deferred wage increases currently payable under existing long-term contracts negotiated in the past. According to the AFL-CIO, an estimated 5 million workers will this year receive deferred or "annual improvement factor" wage boosts of 6 to 10 cents an hour. In the case of construction workers, a large proportion of whom will be negotiating this year, the increases will undoubtedly run somewhat higher if the pattern of the past continues. (See accompanying table of 1957 deferred increases in the building trades.)

Discussing wage prospects in the current issue of its "Collective Bargaining Report," the AFL-CIO further pinpoints the outlook for 1957 by stating that a 2 or 3% rise in the cost of living, as occurred last year, would require off-setting wage adjustments of 4 to 7 cents, bringing the probable total of 1957 wage increases to 10 to 15 cents or more an hour.

• **The pattern**—Some indication of the direction in which the compass is pointing is found in the results of 1956 collective bargaining. The AFL-CIO reports that the most common wage increases ran ahead of those for 1955 by 3 to 5 cents and ranged from 10 to 15 cents, plus fringe benefit improvements.

More specifically, the AFL-CIO notes these 1956 developments:

• About 25% of the increases were from 13 cents or more an hour; 45 to 50% ran from 10 to 15 cents; and about 80% were 7 cents or more.

• Strikes in 1956 involved fewer workers than in any post-World War II year except 1954, and total time lost was about 0.3% of all working time.

• There was a marked increase in the use of long-term contracts generally running for two or three years.

• A corresponding increase occurred in the use of cost-of-living escalator clauses.

• Fringe benefit improvements did not break new ground but liberalized existing benefit practices. Among these were higher benefit levels and broader coverage in health and welfare plans; larger pensions and more frequent use of vesting right provisions; longer vacations; some form of supplementary unemployment compensation; more paid holidays; and provisions for severance and dismissal pay and for paid leaves for funerals and jury duty.

Significant factors listed by the AFL-CIO as leading to the larger 1956 increases include a higher level of business activity, better profit positions of many industries, tight labor markets in many areas, and vigorous union insistence on substantial wage improvements.

In discussing the use of long-term contracts, the AFL-CIO notes that deferred wage increases are usually smaller than the initial increases and less than might be won if the rates could be renegotiated. Union agreement to a long-term contract, the AFL-CIO says, is usually granted "in return for larger increases and/or substantial benefit adjustments from management at the time the agreement was originally adopted."

• **Corroboration**—Corroborating the AFL-CIO findings is a survey of 1956 bargaining by the New York State Department of Labor. It reports that contracts signed within the state during the first nine months of 1956 show that the largest gains in basic rates were made by construction workers; their average increase under 168 contracts was 13.4 cents an hour; in 26% of the cases, the increases were for 20 cents or more. In contrast, the average gain was 10.5 cents in transportation and utilities; 4 cents in textiles; and 9.4 cents in plants manufacturing non-electrical machinery.

Renewed interest in use of escalator clauses is noted, although attention is called to the fact that four of the building trade locals in Buffalo, N. Y., dropped their escalator clauses in 1956 contracts with the Construction Industry Employers' Association.

Taking all industries as a group, the department reports that the trend toward long-term contracts, with two, three or four year terms, continued, with two-thirds of all contracts studied running for more than one year.

Three out of five settlements granted improvements in fringe benefits.

Some Deferred Wage Increases Payable This Year

Union	Employer Group	Amount (in cents per hour)	Effective Date
Asbestos workers	Construction Industry Employer's Assn. of Buffalo, N.Y.	7.5 (H&W) 20 (pension)	Jan. 1
Bricklayers Marble workers	Marble Industry Employers' Assn. of New York & Vicinity	15	Jan. 1
Carpenters	AGS (Intrastate—Wash.)	10	Jan. 1
Carpenters	AGC (Intrastate—Mass.)	20	Apr. 1
Electrical workers	Various electrical contractor associations in New York, N.Y.	15	Jan. 1
Laborers	AGC (Intrastate—N.Y.)	7.5 for some 10 for others	Jan. 1
Laborers	Master Builders of Western Pennsylvania (Intrastate)	7.5	June 1
Laborers	AGC (Wash. and Idaho)	13	Jan. 1
Lathers	Lathing Contractors of New York City	10	Jan. 1
Painters	Bay Area Painters and Decorators Joint Committee (Intrastate—Calif.)	15 (either basis or fringe)	Jul. 1
Painters	Master Painters and Decorators of the City of New York	8	Aug. 1
Plumbers	Plumbing, Heating and Piping Employers' Council (Southern Calif.)	2.5	Jan. 1
Plumbers	Plumbing Contractors Assn. of New York, Long Island and Westchester Counties (Intrastate—N.Y.)	10	Jan. 3

(Based on reports of Bureau of Labor Statistics and Bureau of National Affairs)

Labor Adopts New Code of Ethics

AFL-CIO, to protect itself and its members from internal corruption, redefines its rules of conduct

A rigid code of ethics for the conduct of union affairs was adopted in Miami, Fla., by the AFL-CIO, at the mid-winter meeting of its Executive Council, to assure compliance with the federation's constitutional mandate that it remain free from any and all corrupt influences.

Drafted by the AFL-CIO Committee on Ethical Practices, the code makes it clear that the federation will not tolerate within its ranks, or those of its affiliates, officers and agents who betray their trust or use the labor movement "to advance their own selfish purposes."

The unanimous adoption of the code by the Executive Council during the absence of teamster President Dave Beck followed fast on the heels of a stormy debate over the AFL-CIO's earlier decision that union members or officials pleading the Fifth Amendment for personal protection should be ousted from office. That decision, precipitated by the teamsters' refusal to cooperate with Sen. John McClellan's subcommittee investigating labor racketeering, reaffirmed the AFL-CIO's determination to keep its ranks free from corruption, to insure that union treasury and welfare funds are administered "as a high and sacred trust," and to assure labor's full cooperation in legitimate public investigations of the labor movement and other segments of society.

Wrapped up together, the Executive Council's actions may carry an incidental boon for organized labor if the adage that "those who live in glass houses shouldn't throw stones" still holds true. For still high on the list of labor's "wants," spearheaded largely by Walter Reuther, is a full-scale Congressional investigation of the pricing practices of industry to get to the bottom of the mounting dispute over the inter-relationship of wages and prices in our economy.

• **Precepts**—Consisting of three parts, the new ethical practices code requires that all union health and welfare funds be rigidly, impeccably and openly administered in all their phases; that all crooks, racketeers, Communists and Facists be driven from all positions of leadership or responsibility in the AFL-CIO; and that no union official at any level maintain a personal financial interest in conflict with the full performance of his fiduciary duties as a representative of union members.

The burden of compliance with these precepts is squarely placed on every AFL-CIO affiliate and every AFL-CIO officer and member.

• **Trouble**—The adoption of the code raised still further the blood pressure of the giant teamster union, which, smarting over the Fifth Amendment resolution, had helped to spark the showdown on the building trades' grievances.

Teamster vice president James Hoffa, who has a flair for being close to the teamsters' trouble spots, expressed doubt that the code could or would affect the teamsters and said understanding the code is a two-weeks' job for lawyers. But still outwardly unperturbed by the possibility of the teamsters bolting the AFL-CIO if pushed too far. AFL-CIO President George Meany characteristically replied: "These codes are drafted in very, very good English. They should not be hard to understand."

Right-to-Work Law Is Used As Basis for Damage Suits

An example of right-to-work legislation in action has occurred in Charlotte, N. C., where an insulation contractor, contending it has lost a substantial amount of business because it employs nonunion labor, has filed four lawsuits against seven contracting firms, five labor unions and a department store. It is claiming a total of $360,000 in damages.

The suits were filed by Guy M. Beatty & Co. and are based on alleged violations of the state's right-to-work law as well as its common law. North Carolina is one of 17 states in which union or nonunion membership cannot be made a condition of employment.

Beatty contends that union workers on a number of projects threatened to engage in picketing and strikes if nonunion Beatty employees were used on the same projects. It asserts that the defendant contractors and owner, faced with this prospect, ordered Beatty off the projects after it had refused to unionize. Projects on which the disputes arose included several shopping centers, a department store annex and a housing project at Ft. Bragg.

Among the defendants named in the various suits are J. A. Jones Construction Co., Ross and Witmer, Inc., G. G. Ray Co., Wrenn Brothers, A. Z. Price & Associates, Inc., and J. B. Ivey Co. Unions are the Sheet Metal Workers International Association, International Association of Heat and Frost Insulators and Asbestos Workers, United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry, International Brotherhood of Electrical Workers and International Hod Carriers, Building and Common Laborers Union.

Regulation of Contractors Proposed in Oregon

A bill to empower the Oregon state bureau of labor to license and regulate building contractors was introduced last week in the Oregon state senate by R. F. Chapman, a Coos Bay building contractor.

The bill would establish a seven-man building and construction standards advisory council as a department within the bureau of labor. Two members would be general contractors, one a specialty contractor, one a representative of the building trades unions, one an architect and one from other groups associated with the building industry.

The council would have authority to rate contractors and to limit the field and scope of their building operations.

Labor Briefs . . .

• **Wage boosts**—Current wage negotiations continue with little change from last year's pattern. Delaware electrifications sign a two-year contract for 17½ cents now, 12½ cents next January. Boilermakers in Louisville win 15 cents in a 10-month contract. Asbestos workers in Pittsburgh are striking for 15 cents.

• **Union drives**—The AFL-CIO has proposed spending $7 million in an effort to soften up the Southern States for union organizing. Spread over a three-year period, the plan is to use standard advertising media to sell the merits of unionization to workers. Southern resistance to unions has been reflected in a number of ordinances requiring costly licensing of organizers.

• **Labor merger**—AFL and CIO forces in North Carolina have completed the 20th AFL-CIO merger at the state level. An attempted merger failed last August, largely because of the opposition of the building trades.

29
SALES AND SERVICE LOCATIONS

Birmingham, Ala.; Los Angeles and San Francisco, Calif.; Denver, Colo.; Washington, D.C.; Kellogg, Idaho; Centralia and Chicago, Ill.; Boston, Mass.; Detroit, Mich., Duluth and Minneapolis, Minn.; Butte, Mont.; St. Louis, Mo.; Carlsbad, N.M.; New York, N. Y.; Cincinnati and Cleveland, Ohio; Forty Fort, Philadelphia and Pittsburgh, Pa.; Knoxville, Tenn.; Dallas and El Paso, Texas; Salt Lake City, Utah; Seattle and, Spokane, Wash.; Fairmont and Huntington, W. Va.

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WSW 06466-153

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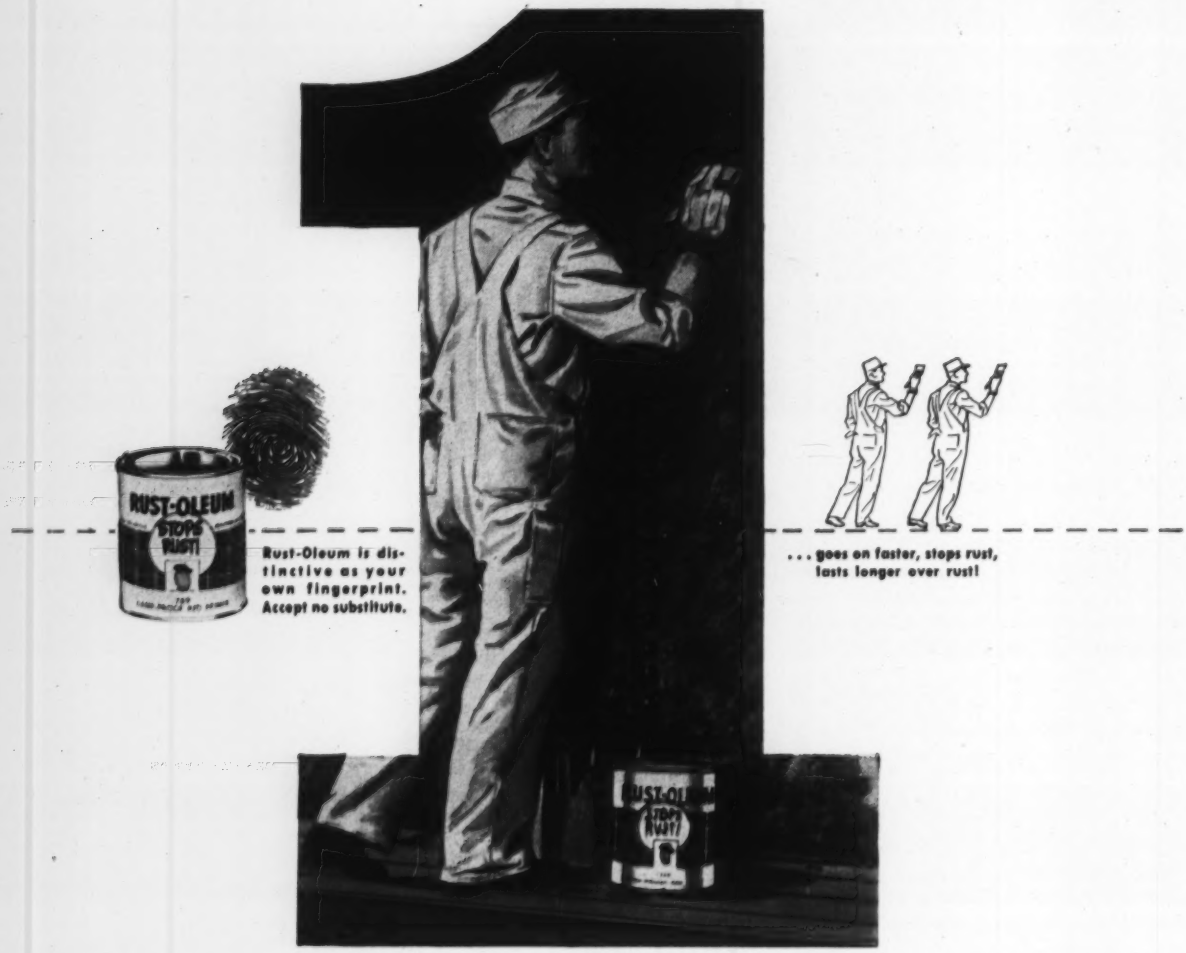
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OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.10 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division, Engineering News-Record, P.O. Box 12, New York 36, N. Y.

Bids: February 28, 1957

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, Canal Law, and Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time, on the 28th day of February 1957, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, G. L. Nickerson, District Engineer, 353 Broadway, Albany 1, N. Y.						
Greene & Rensselaer	WS-R 57-1	Truck Weighing Stations No. 17 (S.H. 5084) and No. 11 (S.H.8384)	0.04	9" Cem. Conc. Pavt. 12' Wide 12' Wide	$225 Plans $10	4,300
DISTRICT No. 2, L. Ketchum, District Engineer, 109 No. Genesee St., Utica 1, N. Y.						
Madison (Rte. 46)	FASH 57-4 FARC 57-14	City of Oneida: South Highway Conn. Oneida-Munnsville, Pt. 1, S.H. 1160 Project U-691(5)	1.81	Asph. Conc. Ty. 1A	$26,000 Plans $15	470,000
DISTRICT No. 3, W. Robinson, District Engineer, WeightLock Building, Syracuse, N. Y.						
Onondaga	F.C. 57-2	City of Syracuse: Van Duyn School Bridge	0.04	Pedestrian Overpass 5' Wide, 3 Spans 122'	$1,400 Plans $10	27,000
Onondaga (Rte. 5)	FARC 57-9	Fayetteville Village: Genesee Street, S.H. 5660 Project F-329(7)	0.25 0.11 Int.)	9" Cem. Conc. Pavt. 50' Wide=0.12 Mi. Asp. Conc. Ty. 1A=0.24 Mi. Comp. I-Beam Br. 260.5'	$24,000 Plans $10	434,000
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal, Rochester 1, N. Y.						
Genesee	WS-R 57-4	Truck Weighing Station No. 9 (S.H. 8431) and No. 4(S.H. 8215)	0.04	10" Unreinf. Cem. Conc. Pave. 12' Wide	$350 Plans $10	6,300
Monroe (Rte. 251 & 253)	RC 57-16	Scottsville–West Henrietta, S.H. 1499-A Scottsville-Rush, S.H. 1393-A	0.13	Asph. Conc. Opt.=0.02Mi. Asp. Conc. Ty. 2B=0.05 Mi. Misc. Work=0.06 Mi. Repair & Paint Existing 235.3' Truss	$4,300 Plans $10	79,000
Monroe	M 57-4	City of Rochester: Genesee Valley Park Br. E-151	....	Rehabilitation of South Guide Wall With Two Steel Sheet Pile Cells	$900 Plans $10	16,361.10
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, State Office Bldg., 65 Court St., Buffalo 2, N. Y.						
Cattaraugus	ASP 57-1	Scenic Road: Allegany State Park	5.00	Asp. Conc. Opt.=4.98 Mi. Misc. Work=0.02 Mi.	$17,000 Plans $10	313,000
Chautauqua	FASS 57-1	Hunt Road, Co. Rd. 82 Project S-465(1)	4.26	Asp. Conc., Opt.	$35,000 Plans $15	615,000
Erie	FINTC 57-1	New York State Thruway-Niagara Section-Sub. N3 (Peabody St. to Louisiana St.) Project I-865(14)	1.24	9" Cem. Conc. Pavt. 2 at 37' Var. Wide=1.17 Mi. Misc. Work=0.07 Mi. 1 RR Sep. Comp. Girder 576' 2 RR Sepn. Comp. I-Beams 173.3' and 258.1 3 Hy. Sepn. Comp. I-Beams 160.5', 131' and 152.8'	$354,000 Plans $100	6,442,000
Erie	FINTC 57-11 PSC 9058	New York State Thruway-Niagara Section, Sub. N5; Elim. of the Grade Crossing of the New York Central Railroad and Porter Avenue: City of Buffalo Proj. I-865(13)	1.92 (0.92 Acc.)	R.R. Relocation=1.25 Mi.; 9" Cem. Conc. Pavt. Var. Wide=0.77 Mi.; Asp. Conc. Opt.=0.50 Mi.; Misc. Work=0.23 Mi.; RR & Hy. Sep Comp. I-Beam, 192.5'; Ramp Comp. I-Beam, 223'.	$86,000 Plans $25	$1,586,000
DISTRICT No. 6, J. H. Thomas, District Engineer, State Office Bldg., 30 W. Main St., Hornell, N. Y.						
Tioga, Allegany & Steuben	WS-R 57-6	Truck Weighing Stations No. 27 (S.H. 8168), No. 28 (S.H. 8253) and No. 35 (S.H. 8211)	0.06	9" Cem. Conc. Pavt. 12' Wide	$600 Plans $10	11,000
DISTRICT No. 7, R. W. Sweet, District Engineer, 444 Van Duzee St., Watertown, N. Y.						
Jefferson	WS-R 57-7	Truck Weighing Station No. 31 (S.H. 5119)	0.04	9" Cem. Conc. Pavt.	$650 Plans $10	12,300
Jefferson (Rte. 11)	FARC 57-12	Philadelphia-Antwerp, S.H. 5548 Project F-476(5)	1.02	Asp. Conc. Opt. Comp. I-Beam Br. 168'	$30,000 Plans $15	545,000
St. Lawrence	FASS 57-2	De Kalb Junction–Rensselaer Falls (Town Road) Project S-470(1)	5.94	Bit. Mulch-Graded Gravel Prestressed Precast Conc. Br. 100'	$32,000 Plans $25	580,000
St. Lawrence (Rte. 37B)	FASSH 57-5	Village of Massena: Center St.–Parker St. Bridge and Interchange Project Us-467(1)	0.64 (0.60 Acc.)	Asp. Conc. Opt. Comp. Weld. Plate Gird. Bridge 840'	$150,000 Plans $25	2,750,000
DISTRICT No. 8, K. G. Rauer, District Engineer (Acting), Pleasant Valley Road, Poughkeepsie, N. Y.						
Dutchess, Orange, Ulster Westchester	WS-R 57-8	Truck Weighing Stations No. 2 (S.H. 5719), No. 12 (S.H. 231), No. 15 (S.H. 5150) and No. 25 (S.H. 5210)	0.08	9" Cem. Conc. Pavt. 12' Wide	$750 Plans $10	13,000
Westchester (Rte. 127)	FARC 57-17	Lake Street, Ridge Street and Harrison Avenue S.H. 1457 White Plains Town Line-Harrison, S.H. 780 Project S-468(1)	0.96	9" Cem. Conc. Pavt. 40' Var. Wide=0.95 Mi. Misc. Work=0.01 Mi.	$28,000 Plans $10	502,000
DISTRICT No. 10, M. E. Gould, District Engineer, 325 W. Main St., Babylon, L. I., New York						
Suffolk (Rte. 25)	FARC 57-20	Riverhead–Mattituck, Pts. 1 and 3, S.H. 8181, Mattituck-Greenport, Pts. 1 and 3, S.H. 8229	2.26	Asp. Conc. Opt.=2.01 Mi. Misc. Work=0.25 Mi.	$28,000 Plans $15	507,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: February 28, 1957

New York State Road Work

NOTICE TO CONTRACTORS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Barge Canal Improvement Law and Highway Law, sealed proposals will be received, until 10:30 A.M., EST, on February 28, 1957 by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, the Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

Contract U.S. 93 for Lowering the Sills, Extending Gates & Miscellaneous Work at Lock 23, Erie Canal, Onondaga County and Lock 1, Oswego Canal, Oswego County, New York

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts and Accounts, 14th Floor, The Gov. Alfred E. Smith State Office Bldg., Albany, New York.

(b) Department of Public Works, 270 Broadway, New York City, N. Y.

(c) In addition to the above mentioned offices, plans, maps and specifications for Contract U.S. 93 may be examined and obtained at the office of Mr. William Robinson, District Engineer, 301 E. Water Street, Syracuse 1, New York.

The deposit for Plans and Proposal Forms for U.S. 93 is $10.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

The Engineer's Estimate of Cost for Contract U.S. 93 is confidential and will be made known at the time of receiving bids.

Proposals for U.S. 93 must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of five percentum, (5%) of the bid. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Barge Canal Improvement Law and to the Highway Law as set forth in "Instructions to Bidders" in the contract specifications.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

Bids: March 5, 1957

Power Authority of the State of New York

BARNHART-PLATTSBURGH TRANSMISSION PROJECT
ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY OF POWER CIRCUIT BREAKERS
SPECIFICATIONS NO. PA-6-28
CONTRACT NO. TP 4

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the design, manufacture and furnishing of power circuit breakers and delivery thereof, f.o.b. cars at destination until 10:30 A.M. Eastern Standard Time on the 5th day of March, 1957, at the Authority's office, 270 Broadway, Room 1305, New York, New York, at which time and place proposals will be publicly opened and read aloud.

Bids will be received for eleven (11) power circuit breakers, associated equipment and services in accordance with the bidding schedule. Erection at the site of installation will be done by Others, but services of erecting engineers shall be provided by the manufacturer when and if required. Delivery of the power circuit breakers and associated equipment will be required June 15, 1958.

Specifications and Proposal Forms for the work will be on file in the Authority's Office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts and may be inspected by prospective bidders during office hours; and may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, upon application and prepayment of a fee of Ten ($10.00) Dollars for initial set of Contract Documents and Five ($5.00) dollars for each additional set, no part of which will be refunded. Two sets must be returned with each bid.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 10% of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
General Manager

Bids: March 4, 1957

Woodstock, New York

ADVERTISEMENT
NOTICE TO CONTRACTORS
FOR
SEEL STANDPIPE, FOUNDATIONS AND APPURTENANCES
FOR
WOODSTOCK WATER DISTRICT

Sealed proposals will be received at the office of the Town Clerk of the Town of Woodstock in the Town Hall, Woodstock, New York on the 4th day of March 1957 until 2:30 P.M., E.S.T. for the furnishing and erection of a 100,000 gallon steel standpipe, foundations and appurtenances near Woodstock, New York.

The Information for Bidders, Form of Bid, Form of Contract, Plans, Specifications and Performance Bond may be examined at the office of the Town Clerk, Town Hall, Woodstock, New York, and at the office of Keis & Holroyd, 257 Broadway, Troy, New York. Copies thereof may be obtained at the office of Keis & Holroyd, upon payment of $25.00 for each set. Any bidder upon returning such set promptly and in good condition, will be refunded his payment, and any non-bidder upon so returning such set within 30 days will be refunded $20.00.

The Town Board of the Town of Woodstock, New York reserves the right to waive any informalities in or to reject any or all bids.

A certified check made payable to the Order of the Town of Woodstock in the amount of 5% of the bid must be deposited by each bidder with his bid as a guarantee that in case a Contract is awarded to him, that he will, within 5 days thereafter, execute such contract and furnish a satisfactory performance bond. On failure to do so, he shall forfeit the deposit as liquidated damages and acceptance of the bid will be contingent upon the fulfillment of this requirement by the Bidder.

The successful bidder will be required to furnish a performance bond satisfactory to the Town of Woodstock, New York, in the amount of the contract, and having as surety thereon, such surety company or companies as are acceptable to the Town of Woodstock, New York.

The work will be let in two contracts, one for the furnishing and erection of the tank and appurtenances and the other for the foundations, valve chamber, pipe work and connection to distribution system.

No bidder may withdraw his bid within 30 days after the date set for the opening thereof. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof.

JOSEPH FITZSIMMONS,
Supervisor

KEIS & HOLROYD
ENGINEERS
TROY, NEW YORK
February 11, 1957

Bids: March 5, 1957

The Hydro-Electric Power Commission of Ontario

ST. LAWRENCE POWER PROJECT
CONSTRUCTION OF GRADE SEPARATION
CANADIAN NATIONAL RAILWAYS
RELOCATION AND HIGHWAY NO. 31

SEALED TENDERS, in quadruplicate, addressed to the undersigned, 620 University Avenue, Toronto 2, Ontario, and clearly marked

"TENDER FOR ST. LAWRENCE POWER PROJECT CONSTRUCTION OF GRADE SEPARATION CANADIAN NATIONAL RAILWAYS RELOCATION AND HIGHWAY NO. 31"

will be received up to 4:30 o'clock p.m., Eastern Standard Time, on TUESDAY, MARCH 5, 1957.

The work generally consists of the construction of a detour, necessary clearing, grubbing, excavation and compaction of materials, pile driving, construction of concrete retaining walls and placing of backfill, completion of bridge deck (erected by others) to include sidewalks, curbs, asphalt paving and installation of hand rails, and all other incidental or associated work as specified in the Commission's tendering documents C-408-56. This work shall commence within fifteen (15) calendar days after the date of receipt of notice to proceed and shall be completed by June 15, 1958.

Copies of the tendering documents may be obtained on or after Monday, February 4, 1957, at the office of the Director of Supply, 620 University Avenue, Toronto 2, Ontario, on payment of twenty-five dollars ($25.00) for each set. This charge will not be refunded.

Tendering documents may be inspected at the above address and at the offices of the following: the Commission's Field Office, Cornwall, Ontario; Power Authority of the State of New York, 270 Broadway, New York 7, New York; and Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts.

Each tender must be accompanied by a certified cheque drawn on a Canadian chartered bank for a sum calculated as follows: On tenders up to $500,000.00, the sum shall be 10 per cent of the total amount of the tender; on tenders over $500,000.00, the sum shall be 10 per cent of the first $500,000.00 and 5 per cent of the excess over $500,000.00. Provision for the return of the cheques appears in the tendering documents.

The successful tenderer will be required to furnish a performance bond in the form approved by the Commission and issued by a bonding company licensed as such in the Province of Ontario and acceptable to the Commission for one hundred per cent (100%) of the total amount of the contract. The lowest or any tender will not necessarily be accepted.

E. B. EASSON
SECRETARY

Bids: March 12, 1957

Contract BP-150.002

ADVERTISEMENT
THE PORT OF NEW YORK AUTHORITY
BROOKLYN-PORT AUTHORITY PIERS
FURMAN STREET CURB AND SIDEWALK

Sealed proposals for the furnishing and installation of concrete sidewalk, steel faced concrete curbing and a catch basin at the south west corner of Furman and Fulton Streets, in the Borough of Brooklyn, New York, N. Y., will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P. M. on Tuesday, March 12, 1957, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115, and copies will be furnished upon request. No deposit will be required but the documents shall be returned in good condition not later than forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, February 21, 1957

U. S. Government

COMMONWEALTH OF MASSACHUSETTS. Department of Public Works. NOTICE TO CONTRACTORS: Sealed proposals for State Highway Construction on Relocation of Route #2 in the Towns of ORANGE and WENDELL F. A. P. F-348(2) will be received at Room 427, 100 Nashua Street, Boston, Mass., until 2:00 P.M. of TUESDAY, FEBRUARY 26, 1957, and at that place and time publicly opened and read. Proposal guaranty: $38,000. Charge for plans and proposal forms: $20.00, amount returnable only to bidders. Complete information at said office; plans on display at District office in Greenfield. Minimum wage and dump-truck rates have been established. Right reserved to waive any informality in or reject any or all proposals. An award will not be made to a Contractor who is not equipped to undertake and complete the work. By: CARL A. SHERIDAN, Commissioner of Public Works. February 9, 1957

OFFICIAL PROPOSALS

Bids: March 7, 1957

Power Authority of the State of New York

BARNHART-PLATTSBURGH
TRANSMISSION PROJECT
ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY OF
TRANSMISSION LINE TOWERS
SPECIFICATIONS NO. PA-6-21
CONTRACT NO. TP2

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the design, manufacture, and furnishing of transmission line towers for the Barnhart-Plattsburgh Transmission Project and delivery thereof f.o.b. destinations, until 10:30 A.M., Eastern Standard Time, on the 7th day of March, 1957 at the Authority's office, Room 1305, 270 Broadway, New York, at which time and place the proposals will be publicly opened and read aloud.

Bids will be entertained for seven (7) transmission line towers and services in accordance with the bidding schedule. Erection at the site of installation will be done by others, but services of erection engineers shall be provided by the manufacturer, if and when required. Delivery will be required starting September 15, 1957.

Plans, Specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts; may be inspected by prospective bidders during office hours; and may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, upon application and prepayment of a fee of Ten ($10.00) Dollars per initial set of contract documents and Five ($5.00) Dollars per set for additional sets, no part of which will be refunded. Two sets must be returned with each bid.

Bids will not be restricted to American manufacturers.

Bids must be made in duplicate in accordance with the instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than ten percent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

Bids: April 2, 1957

City of Detroit, Michigan

ADVERTISEMENT
WOODMERE PUMPING STATION
SUBSTRUCTURE
DEPARTMENT OF PUBLIC WORKS
CONTRACT PW-2128(BI)

Sealed proposals for a pumping station substructure, to be located at 9300 W. Vernor Highway, will be received at the Office of the City Engineer, 528 City-County Building, Detroit 26, Michigan, until 2:00 P.M., Detroit Time, April 2, 1957, and then at such place and time publicly opened and read aloud.

The work included consists of the construction of the concrete caisson and the substructure part of the pumping station. The caisson will have an outside diameter of approximately 80 feet, and is to be sunk into place about 103 feet below grade. Included is excavation, concrete work, concrete piling under the substructure surrounding the caisson, structural steel, grating and other miscellaneous metal work, certain plumbing, and lightning protection work.

The Bidding Documents may be examined at the Office of the City Engineer during business hours and copies may be obtained upon deposit of $15.00 per set, which deposit will be refunded upon the return of the Bidding Documents in good condition within 10 days after the date for opening of bids.

Each proposal must be accompanied by a certified check, bank draft, or a satisfactory surety bid bond in an amount not less than 5 percent of the total bid price as guarantee and security for the acceptance of the Contract.

Checks shall be made payable to the Treasurer, City of Detroit.

No proposal once submitted may be withdrawn for at least 45 days after the actual opening of the bids. The City of Detroit reserves the right to waive any irregularity in any bid, or to reject any or all bids should it be deemed for its best interest.

CITY OF DETROIT
GLENN C. RICHARDS
Commissioner of Public Works

M. F. WAGNITZ
City Engineer

OFFICIAL PROPOSALS

Bids: March 20, 1957

Construction of Sanitary Sewers and Appurtenances

NOTICE TO CONTRACTORS

Sealed proposals will be received by Springettsbury Township Sewer Authority of Springettsbury Township, York County, Pennsylvania, in the Springetts Fire House, 2914 E. Market St., York, Pa., at 8:00 P.M. Eastern Standard Time March 20, 1957 for the construction of Sanitary Sewers and Appurtenances in various improved sections of Springettsbury Township, York County, Pa., at which time and place they will immediately be publicly opened and read aloud.

The work under this contract will consist of the construction of approximately 18.5 miles of Vitrified Clay Pipe Sewer from 5" to 12" in diameter.

The Information for Bidders, Form of Contract, Plans, Specifications and Form of Performance Bond may be examined at the office of Weigle Engineering Co., 30 North Duke St., York, Pa. and copies thereof may be obtained at the said office of Weigle Engineering Co. upon payment of $30.00 for each set, which will not be returned.

The Springettsbury Township Sewer Authority reserves the right to waive any informalities in, or to reject, any or all bids.

A bid bond or certified check made payable to the Springettsbury Township Sewer Authority in the amount of five percent (5%) of the bid must be deposited by each bidder with his bid as guarantee that, in case the contract is awarded to him, he will within five (5) days execute such contract and furnish a satisfactory performance bond. On failure to do so, he shall forfeit the deposit as liquidated damages and acceptance of the bid will be contingent upon the fulfillment of this requirement by the bidder.

The successful bidder will be required to furnish a Performance Bond in the amount of the bid submitted and a separate Labor and Materialman's Bond in an amount equal to fifty percent (50%) of the total of the bid submitted. These bonds shall have a Surety Company of Companies thereon as are acceptable to the Authority.

No bidder may withdraw his bid within forty-five days (45) after the date set for the opening thereof. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof.

Springettsbury Township Sewer Authority
David C. McIntosh, Secretary
541 S. Vernon Street
York, Pennsylvania

February 21, 1957

Bids: March 5, 1957

Construction of Sewer System

NOTICE TO BIDDERS FOR CONTRACT FOR CONSTRUCTION OF THE SEWER SYSTEM IN THE DONALD PARK SEWER DISTRICT.

NOTICE IS HEREBY GIVEN that sealed proposals are sought and requested for furnishing all materials and doing all work necessary for the performance according to specifications of a contract to be let by the Town of Greenburgh for constructing a trunk line sewer and appurtenances.

The sealed proposals will be received by the Town Board at its office in the Town Hall, Tarrytown Road, Elmsford, New York, at 8:00 o'clock in the evening on March 5th, 1957, and will be considered publicly at such time and place. Plans, specifications, and estimate of the expense, a proposed contract for the execution of the work, and forms of proposals can be examined at the office of the Town Clerk at the Town of Greenburgh at the aforesaid address between the hours of 9:00 A.M. and 5:00 P.M. from February 21, 1957 to March 1st, 1957.

Proposals must be made upon and in accordance with the form of proposal prepared by the Attorney, which form of proposal will contain accompanying instructions to bidders and a copy of the specifications for said work, and the same may be obtained at the office of the Town Clerk at the Town Hall, Tarrytown Road, Elmsford, New York, on or after February 21, 1957.

Proposals shall be made and received by the following conditions:

Each proposal must be accompanied by the deposit of a certified check payable to the order of the Supervisor of the Town of Greenburgh in the sum of $3,250.00, or a bond with sufficient sureties to be approved by the Supervisor in a penal sum of $3,250.00, conditioned that if the proposal is accepted the successful bidder will enter into a contract for the work and that he will execute within 15 days from the day of the acceptance of the proposal a suitable security bond in the sum of the amount of the contract, conditioned for the faithful and prompt performance and completion of the work specified in the contract.

All deposits, except that of a successful bidder, will be returned.

Upon acceptance of his bid, if the successful bidder fails to enter into a contract pursuant to the requirements of the Board or fails to give the further security prescribed in this notice within the time limited therein, then the check deposited as aforesaid and the monies standing to the credit of the same, shall be forfeited to the Town as liquidated damages, or the payment of the bond enforced for the benefit of the Town.

Dated: February 8, 1957.

BY ORDER OF THE TOWN BOARD
OF THE TOWN OF GREENBURGH
ELIZABETH C. SMITH
TOWN CLERK

OFFICIAL PROPOSALS

U. S. Government

United States Department of Commerce, Bureau of Public Roads, February 8, 1957. Sealed bids will be received at the Inter-American Highway Office, Bureau of Public Roads, Room 4009, General Services Administration Building, Washington 25, D. C. until 2 p.m., E.S.T., February 28, 1957 for the construction of Nicaragua project 8-A on the Inter-American Highway in Nicaragua, consisting of grading, drainage, selected borrow base and other work. The project begins at Sebaco about 60 miles north of Managua and extends north for about 48 miles to Condega. The approximate quantities of the major items of work are: 1,288,000 cubic meters Unclassified Excavation, 590,000 cubic meters Borrow Excavation, 186,000 cubic meters Selected Borrow Base Course, 3100 cubic yards Class A Concrete in Box Culverts, 365,000 lbs. Reinforcing Steel, 15,000 linear feet Neatable, Bituminous Coated Corrugated Metal Culvert Pipe (from 24" to 72"). Bids will be accepted only from United States or Nicaragua firms with a satisfactory record of performance on highway construction in the United States or in Nicaragua. The need for progress payments, where progress payments may legally be made, will not be treated as a handicap in awarding a contract. Plans, Specifications, and Proposal Forms are available upon request from the address given above, or at the Inter-American Highway District Office, Bureau of Public Roads, No. 203 Carlos Palazio Bldg., Calle 5a N.W., Managua, Nicaragua. This is a readvertisement with alternate bids optional. C. D. Curtiss, Commissioner of Public Roads.

Department of Commerce, Bureau of Public Roads, February 11, 1957. SEALED BIDS will be received at the office of the Regional Engineer, Bureau of Public Roads, 1440 Columbia Pike, Arlington, Virginia, until 11:00 a.m., E.S.T., MARCH 14, 1957, for Project 2F1, Blue Ridge Parkway, Watauga County, North Carolina. Grading, Draining, Gravel or Stone Base Course, and other work from U.S. 421 at Deep Gap to Triplett Road. The approximate quantities of the more important items are: 608,160 cu. yd. Excavation, 41,200 tons Crushed gravel or Crushed stone, 950 cu. yd. Concrete and 1,150 cu. yd. Stone Masonry. Minimum wage rates have been fixed as required by law. Plans, specifications, and proposal forms are available upon request at the address given above or Bureau of Public Roads, 920 South Jefferson Street, Roanoke, Virginia. H. J. Spelman, Regional Engineer.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4852) will be received at Glendo, Wyoming until March 27, 1957, for furnishing labor and materials for earthwork, structures, and surfacing of access road and county road relocation for Glendo Dam and Reservoir, Missouri River Basin Project, Wyoming. Location near Glendo, Wyoming. Principal items are 130,000 cu. yds. excavation; 2 miles widening existing roadway; 6 miles plant-mix bituminous surfacing; 5.2 miles gravel surfacing; and other work. Completion time 180 days. For particulars, address Bureau of Reclamation, P. O. Box 127, Glendo, Wyoming; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

EMPLOYMENT OPPORTUNITIES

DISPLAYED

The advertising rate is $31.80 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

—RATES—

UNDISPLAYED

$2.10 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Position Wanted ads take ½ of above rate.

Box Numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD
P. O. Box 12, N. Y. 36. March 14th issue closes March 4th.

SPECIFICATIONS WRITER

A leading international industrial engineering company has immediate opening available for an experienced building specification writer.

Applicants should possess at least several years experience writing building specifications for material purchases and subcontract specification for all building trades.

This is a permanent position, offering good starting salary, all fringe benefits, good working conditions, high management cooperation, and opportunity for advancement.

Please submit a complete resume stating education, experience, salary requirement, and earliest date available to:

The H. K. FERGUSON COMPANY
ENGINEERS AND BUILDERS
1783 East 11th St., Cleveland 14, O.

STRUCTURAL DESIGNERS

FOR HIGHWAY BRIDGE WORK

SENIORS and JUNIORS

Work in New York City and New Jersey

BROWN & BLAUVELT
468 Fourth Avenue, New York City
44 Cooper Street, Woodbury, New Jersey

CIVIL ENGINEERS
SURVEYORS AND DESIGNERS

Experienced rodmen, chainmen, instrumentmen, designers and draftsmen for permanent highway work. Considerable choice of location in Washington State. Good opportunity for advancement. Progressive, non-political merit system. Minimum of 12 working days each of vacation and sick leave per year. Retirement system. Five step automatic increase wage schedule. Minimum entrance salaries $349 for rodmen and chainmen and $414 for instrumentmen; higher starting salary possible depending on experience and/or education. Also can use recent C. E. graduates or experienced designers for bridge design work in Olympia. Some openings for highway construction inspectors, soils men, planning and traffic engineers. Write for application blank to Wm. T. Read, Personnel Officer, Washington State Highway Department, Transportation Building, Olympia, Washington. State preference of location and type of work in your letter.

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Civil Engineer-Estimator: for industrial construction. Approximately 10-15 years of both estimating and job experience. Salary open, position permanent. Located in Florida. P-3632, Engineering News-Record.

Superintendent—Swimming pool construction. All phases gunite pool experience essential. Salary open. Westchester County. Reply Box 505, Bedford, N. Y.

Civil Engineer—building construction—Main office in southern Connecticut—quantity estimating, cost work, scheduling, etc. P-4232, Engineering News-Record.

Wanted—Young graduate architect or engineer interested in designing and assisting promotion use of machine made concrete block in prestressed beams and panels. Contact: P. M. Park, Besser Company, Alpena, Michigan.

Position Vacant—Field Superintendent for concrete bridge and dam construction. Please furnish complete education and experience data, references and salary desired. Reply to P-4282, Engineering News-Record.

Designers—Electrical and Piping . . . Power Plants and Industrial Buildings. Marbarry Corp., 120 Greenwich St., New York City 6, N. Y. REctor 2-3749.

Highway Materials Engineers and Inspectors. Large commercial Inspection and Testing Agency desires to expand permanent personnel gradually during next several months. Openings will be in various areas, Continental United States. Submit age, education, experience, and salaries earned. All correspondence confidential. P-4274, Engineering News-Record.

Wanted—Experienced Designers on Highway Projects. Location central Ohio. Excellent opportunities for those who can qualify. Long range work program. Generous employee benefits. Reply stating qualifications, availability, and salary requirements. P-4264, Engineering News-Record.

Graduate Civil Engineers not over 30 and preferably single. Must have military training completed and interested in the building construction business, starting in the field. We offer opportunity for rapid advancement to ambitious, hard-working young men willing to accept responsibility. Starting salary $110.00 per week if inexperienced with higher wages for those with some experience. Send complete history data. Martin K. Eby Construction Co., Inc., 610 N. Main, Wichita 5, Kansas.

Soils Engineer—prefer man with MS in soils about 1945 or 1946—to head up a design group in a firm of consulting engineers specializing in design of dams. Must be top-notch design engineer and supervisor. Salary open. Location Midwest. P-3942, Engineering News-Record.

Bridge Designers and Draftsmen with experience for permanent positions. Forward full educational, employment and personal data with salary requirements. Macomber & Faber, 1824 North Fourth Street, Harrisburg, Pennsylvania.

Bridge Superintendents and Foremen for sizable structure project in Richmond, Virginia. P-4372, Engineering News-Record.

POSITIONS VACANT

Wanted—Graduate Civil Engineers for work in New York State by long established engineering organization. Experience in highway and municipal fields or concrete structural design is necessary. Age 30 to 40. Give resume of education, engineering experience and salary requirement in reply. P-4254, Engineering News-Record.

Associate and assistant professors for fields of advanced strength, elasticity, dynamics and fluid mechanics. Dept. of Applied Mechanics, Univ. of Kansas, Lawrence, Kansas.

Highway and Bridge Engineers—Designers. Experienced, for Permanent Positions in our New York Office. Excellent Salary Plus Overtime. Air mail resume to Farkas & Barron, Consulting Engineers, 5 Beekman Street, New York 38, N. Y., or call BEekman 3-8387.

Irrigation Engineer—For position as assistant to Engineer-Manager on operating irrigation system, Arizona. Desire man with experience in construction and management. Salary open. Please submit record, references and salary requirement first letter. P-4257, Engineering News-Record.

Structural Engineers & Draftsmen—to design and detail building-frames and foundations. Excellent opportunity for a good future with a growing firm in a progressive community. Salary depends upon experience and ability. Replies treated confidentially. Stuart H. Snyder, Consulting-Engineer, 321 Denison Bldg., Syracuse, N. Y.

Civil Engineer—For design of pavements and drainage structures, etc. with experience on airfields to include grading and site preparation. Long time engagement offered with well established firm under ideal working conditions. Send transcript of experience record, list references, indicate salary expected and when available. Clark, Buhr & Nexsen, Architects & Engineers, P.O. Box 9628, Norfolk 5, Virginia.

Civil Engineers to work with consulting engineering firm. Long established municipal consulting firm desires to secure civil engineers for permanent positions. Experience in water and sanitation required. Offices located in very desirable small college community in Colorado area. Expansion of firms operations provide unlimited opportunities for advancement for properly qualified engineers. Firm desires to employ engineers with from one to fifteen years of experience. Salaries $5,100 to $6,600. Please give experience and full details in reply. Replies will be held confidential if requested. P-4371, Engineering News-Record.

Controller: For heavy and highway contractor main office Phila. thorough knowledge of construction, accounting, taxes, costs, insurance, purchase procedure, directs home and field office administrative personnel. Reply fully for personal interview. P-4324, Engineering News-Record.

Wanted—Dirt Superintendent to work for long established Illinois Contractor, operating in Illinois, Kentucky, Missouri. Salary commensurate with experience and ability. P-4323, Engineering News-Record.

Wanted: Structural Engineer for design of steel and concrete structures—Knowledge to analyze indeterminate structures is essential—The position open for a qualified engineer with or without experience to be a member of the firm in the future. Reply in full with reference and recent photograph. Location North Carolina. P-4322, Engineering News-Record.

Wanted in Indiana—Graduate engineer 25 to 35 to work at all phases of Asphalt Paving contracting. Offer option to buy 1/3 interest with terms. P-4317, Engineering News-Record.

(Continued on opposite page)

POSITIONS VACANT

Continued from opposite page

Young graduate Civil Engineer or equivalent experience to assist Director of Public Works, village of 30,000. Salary Plan $5904 to $6840. Write Director of Personnel, Village of Maywood, Illinois, 125 South 5th Avenue.

Engineer: Recent civil graduate to join W. Pennsylvania organization, designing and manufacturing structural prestressed concrete for buildings and bridges. We will train; no experience necessary; good future offered. P-4295, Engineering News-Record.

Vice President for Construction and Design. Overall charge of Architectural and Construction Departments of rapidly growing Midwest industrial contractor. Direct supervision of fast moving construction operations. Coordinate departments. Unusual opportunity. P-4352, Engineering News-Record.

EMPLOYMENT SERVICES

Salaried Positions $6,000 to $35,000. We offer the original personal employment service (established 46 years). Procedure of high standards individualized to your personal requirements. Identity covered. Particulars—R. W. Bixby, Inc., 559 Brisbane Bldg., Buffalo 3, N. Y.

POSITIONS WANTED

Canadian Civil Engineer (McGill '26), specialized in municipal problems, seeks a permanent responsible position with a municipality or private concern, located in the Southern States. Excellent administrative, professional and personal background. Now employed as a free-lance municipal consultant. 54 years old. Member of the Corporation of Professional Engineers of Quebec. Full details on request. PW-4003, Engineering News-Record.

General Construction Manager or Superintendent—Practical background, bricklayer by trade. Operated own company thirty-five years. Past ten years grossed up to five million dollars per year—mostly hospitals, schools, and housing in five hundred thousand to one and a half million dollar jobs each. Dissolved company. Decided to retire but find it is boring. Fifty-seven years old, excellent health, married, three teen age children. Need lots of action yet. Would like position as Assistant to President or General Manager of construction company with plenty of problems. Salary open and dependent on responsibilities assumed. Able to furnish best of references. PW-4096, Engineering News-Record.

Chf. Estimator—B.C.E. 10 yrs. heavy construction bids, subs, payments, costs. P.E. license N. Y. and N. J. Prefer Metropolitan area. PW-4120, Engineering News-Record.

Surveying field parties, 3 or 4 men, fully equipped, well exp. in all types of work. Under licensed supervision. Willing to travel. PW-4122, Engineering News-Record.

Equipment Superintendent with experience and ability to handle large foreign jobs. Available March 1st. PW-4135, Engineering News-Record.

Registered Graduate Civil Engr. age 32. Diversified engineering background. Want employment with engr. or contracting firm with option to purchase in 1-3 years. Have capital to invest. PW-4141, Engineering News-Record.

(Continued on page 308)

When Answering

BOX NUMBERS...

to expedite the handling of your correspondence and avoid confusion, please do not address a single reply to more than one individual box number. Be sure to address separate replies for each advertisement.

HIGHWAY ENGINEERS
DESIGNERS
DETAILERS

FOR OFFICE WORK IN ST. LOUIS ON HIGHWAYS EXPRESSWAYS AND ASSOCIATED CIVIL WORKS

- Permanent employment for qualified men
- Ample opportunity for advancement based on merit
- Generous transportation & moving allowances
- Inquiry as to overseas field and office openings

Plus: Employee Benefit and Retirement Plan, Paid Vacations, Holidays, Sick Leave. Blue Cross available

PLEASE WRITE FULLY TO OR INQUIRE AT

SVERDRUP & PARCEL ENGINEERING CO.

1134 LOCUST ST. ST. LOUIS 1, MO.

HIGHWAY AND STRUCTURAL ENGINEERS - DESIGNERS - DRAFTSMEN

Several years' experience in highway or bridge design work preferred but not necessary if educational background is good.

This firm of Consulting Engineers is anxious to employ men who desire long range permanent work, who want to develop as professional engineers and who are eager to accept ever increasing responsibility.

Please reply giving experience record to:

Besides well developed training courses the company offers vacations and holidays with pay, sick leave, blue cross, free life insurance, overtime, moving allowance, and an employee profit sharing plan.

Positions in the above categories available in permanent company offices at Chicago, New York, San Francisco, Oklahoma City, Toronto, Buffalo and Sanford, Florida.

DE LEUW, CATHER & COMPANY

150 NO. WACKER DRIVE *Engineers* CHICAGO 6, ILLINOIS

Highway & Bridge Engineers Designers & Draftsmen

Career opportunities for men interested in professional recognition.
Excellent working conditions and employee benefits including liberal retirement program.
Openings in Pennsylvania, Maryland, Florida, West Virginia, Mississippi and overseas.

Air Mail Resume TO R. L. SHAW, Personnel Director

MICHAEL BAKER, Jr., INC.

BAKER BLDG. *Consulting Engineers* ROCHESTER, PA.

STRUCTURAL STEEL DETAILERS AND ESTIMATORS

Have openings available for competent detailers and estimators who have had experience with steel fabricators. Please give full details in letter of application.

The MIDWEST STEEL & IRON WORKS Co.
P. O. Box 5384, Terminal Annex Sta.
Denver 17, Colorado

ENGINEERS

Long established firm of consulting engineers with world-wide practice needs both beginners and experienced civil, electrical, mechanical, and foundation engineers for interesting work on large dams, powerplants, and river control works. Permanent positions. Liberal employee benefits. Starting salaries dependent on qualifications. Please send complete resume to Hugo Niemi, Personnel Manager.

HARZA ENGINEERING CO.
400 W. Madison St. Chicago 6, Ill.

ENGINEERS—DESIGNERS

Highway & Bridge

Excellent advancement opportunities in a long established and progressive consulting firm, for engineers experienced in the design of highways and bridges.

Interesting and challenging permanent assignments. Attractive salaries and liberal employee benefits.

Note: Employees of BPR, state, county or city highway organizations may not be employed without written consent of such public employer.

Write for application blank.

CAPITOL ENGINEERING CORPORATION
Dillsburg, Pennsylvania

STRUCTURAL ENGINEER

For central engineering department of fast-growing Chicago manufacturing firm with large number of plants in U. S. and Canada.

Work being done includes buildings, from small additions to complete new plants, shops, warehouses, offices, and laboratory research facilities. Prefer graduate civil or architectural engineer to handle structural design of steel, concrete, and timber for such buildings. Desirable to have at least three years experience in engineering office with similar duties including checking of structural shop drawings and structural drafting.

Write Personnel Manager,
American-Marietta Company,
101 E. Ontario, Chicago 11, Illinois

McKEE NEEDS

- **Structural**
- **Concrete**
- **Piping**
- **Mechanical**

ENGINEERS

Our Metals, Refinery and Industrial Divisions offer you wide choice of opportunity to make full use of your talents, with excellent prospects for promotion to supervisory, staff and executive posts.

Broad diversification of work in our three engineering divisions assures you *permanent* security of employment.

You can build a strong foundation for your future with McKee. For complete information on the McKee organization and the extra benefits this company offers you write for our folder "The Key to Your Future" or contact us by telephone.

Telephone TOwer 1-2300, Cleveland, Ohio
or write to Edward A. Kolner
Arthur G. McKee & Company
2300 Chester Ave., Cleveland 1, Ohio

Arthur G. McKee & Company
Engineering offices in
CLEVELAND, OHIO • UNION, N.J. • TORONTO, ONT.

NEW POSITION

Cincinnati Sewage Disposal

Superintendent

Mill Creek Sewage Works:

Salary range, $7830 to $8613 a year. Supervise plant operation of 129 mgd capacity plant, now under construction. Modified primary treatment, separate sludge digestion with sludge disposal. Must have four years experience in sewage plant operation, engineering degree, be able to qualify for Ohio P. E. and Class "A" operator's license. Management ability essential.

Liberal employment benefits, retirement plan.

Apply before APRIL 1, to:

CIVIL SERVICE COMMISSION
260 CITY HALL
CINCINNATI 2, OHIO

Engineers
Designers
Sr. Draftsman

Relocate to
San Francisco or
Los Angeles California

Excellent opportunities for qualified technical personnel having experience in steam power, refinery, hydro power, sub-station, or related projects.

Send resume to:
Manager of Employment & Placement
Industrial Relations Division

BECHTEL

Engineers & World-Wide Builders for Industry

220 Bush St. San Francisco, Calif.
Recruiting Offices in New York, Los Angeles, San Francisco and Houston

Civil Engineers

General construction firm expanding both its staff and volume wants civil engineers for permanent positions as field engineers.

Firm operates throughout New York State.
Please give full resume, strictly confidential.

John W. Rouse Construction Corporation
8 Church Street Gouverneur, New York

SUPERINTENDENT BUILDING CONSTRUCTION

Top flight man by growing company operating nationally. Give all pertinent data in reply including education, experience, salary, references and when available.

BLOUNT BROTHERS CONSTRUCTION CO.
P. O. Box 949 Montgomery, Ala.

ASSISTANT CHIEF ENGINEER

C.E. experienced in structural steel detailing and design, checking and estimating to understudy for Chief Engineer with long established structural steel fabricator. Submit detailed resume and photograph.

C. E. MORRIS COMPANY
745 Curtis Ave. Columbus 3, Ohio

STRUCTURAL DRAFTSMEN

FOR HIGHWAY BRIDGE WORK

In New York City and New Jersey

BROWN & BLAUVELT

468 Fourth Avenue, New York City

44 Cooper Street, Woodbury, New Jersey

SANITARY ENGINEERS

With at least 5 years' responsible experience in municipal and industrial waste field.

To arrange for interview phone or send resume to:

Miss Ferguson, Wisconsin 7-4600

GIBBS & HILL Inc.
461 8th Avenue (33rd St)
New York 1, N. Y.

SALES ENGINEER

A major steel company has need for sales engineer to promote and sell fabricated products in New England states. Excellent opportunity for man 25 to 30 years old with engineering background and a desire for sales work. Attractive starting salary with company car, expenses and bonus plan.

P-3808, Engineering News-Record
Class. Adv. Div. P.O. Box 12, N. Y. 36, N. Y.

ENGINEERS

Civil Engineers with or without experience in hydraulics, soils, concrete design, contracts estimating, dams or construction for work on flood control projects in Pennsylvania. Salary to $9000. State experience, salary requirements and references.

P-4228—Engineering News-Record
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

SOUTH DAKOTA DEPARTMENT of HIGHWAYS

Engineering Opportunities

Professional openings on the South Dakota Department of Highways staff present permanent opportunities for Civil Engineering graduates in the following classifications and salary brackets:

Structural Designer $5940-7020

Structural Draftsman . . . $5220-6240

Civil Engineers (Highway — Survey — Design — Construction—Drafting) . . . $4980-7020

Benefits include salary schedule, sick leave with pay, paid vacations, military leave with pay, available hospitalization plan.

For application forms, contact:

C. V. DOODY, Personnel Director
Department of Highways
Pierre, South Dakota

GRADUATE CIVIL ENGINEERS or ARCHITECTURAL ENGINEERS

Major Southwestern general contractor needs engineers for work in estimating dept. Job requires investigation and take off and can also lead to field work depending on interest of employee. Excellent opportunity for young men to obtain desirable position with reliable firm doing all types of construction work. Have openings in El Paso, Dallas, and Los Angeles offices.

ROBERT E. McKEE
GENERAL CONTRACTOR, INC.
PO BOX 562 EL PASO, TEXAS

DEPARTMENT OF WATER AND SEWERS CITY OF MIAMI FLORIDA

CIVIL ENGINEERS:
(Civil Service Positions)
SALARY OPEN

Job Requirements: Design of water supply, distribution, treatment and pumping facilities, sanitary sewers, sewage pumping and sewage treatment.

Education and Experience Requirements: B. S. in Civil or Sanitary Engineering and five (5) years experience in above special fields—or—the equivalent combination of related education and experience in lieu of a degree.

Additional data will be sent to all applicants.

Send complete summary of your education and experience to: Mr. C. F. Wertz, Director, Dept. of Water and Sewers, P. O. Box 316, Miami 33, Florida.

MECHANICAL ENGINEERS

$7200 to $9600

Positions available as Senior Engineer and Engineer. Senior Engineer will have opportunity to be appointed Head of Mechanical Department after proving his ability.

Qualifications:

1. College degree or equivalent.
2. Registered Engineer or capable of obtaining registration. Membership in ASME desirable.
3. Broad experience (min. 5 years) as a designer on wide variety of mechanical engineering projects such as Power and Heating Plants; Heating, Ventilation, and Air conditioning; Steam, Gas, Compressed Air, Gasoline, and Process Piping Systems; Dust Collection systems; Materials handling systems.
4. Must possess sound basic knowledge of requirements of systems as well as equipment and other components.
5. Recommendations must be obtainable from former employees.

Location of Positions:

Augusta; Atlanta; Pensacola, Fla.

FOR PROMPT ACTION

Submit personal data, references, education and experience resume'. Interviews will be arranged.

PATCHEN AND ZIMMERMAN, ENGINEERS
AUGUSTA, GEORGIA

PLANNING AND SCHEDULING ENGINEER

To coordinate project activities on executive staff level by establishing and maintaining project schedules and progress report control systems.

Men with 5 years related engineering and construction experience in power, heavy industrial, chemical or petroleum fields. Engineering degree required. Apply in confidence to:

MR. L. H. RYAN
BURNS AND ROE, INC.
ENGINEERS & CONSTRUCTORS
160 WEST BROADWAY, N. Y.

STRUCTURAL ENGINEERS DESIGNERS DRAFTSMEN

Prefer several years or more experience in any of these fields:

BRIDGES

BUILDINGS
EXPRESSWAYS
HYDRO PROJECTS
TEST FACILITIES*

Will consider lesser experience with good educational background, including several recent graduates to round out a planned expansion program. Occasional openings for combination field men. These are permanent additions to our regular staffs.

We are professional engineers engaged primarily in design which covers a wide scope of practice. The variety and unusual charater—for example, the proposed world's largest bridge project—offer excellent opportunity for professional development and advancement.

Immediate openings in our St. Louis general offices and occasionally in our San Francisco branch office. Confidential interviews can also be obtained at Washington, D. C., and Portland, Oregon.

Paid vacation, sick leave, holiday, overtime. Excellent Employee Benefits Plan provides retirement income plus life and disability insurance. Blue Cross. Moving allowance.

Please write fully, including salary data, to

SVERDRUP & PARCEL, Inc.
ENGINEERS — ARCHITECTS
915 Olive St. Louis 1, Mo.

*We are designers of the technical facilities for the Arnold Engineering Development Center, operated by our subsidiary, ARO, Inc

ENGINEERS - DESIGNERS - DRAFTSMEN

for work on
BRIDGES AND EXPRESSWAYS

Opportunity for continuous employment in our Louisville, Chicago, Cincinnati or Lansing offices for graduates or engineers with practical backgrounds. Overtime allowance, vacation time and insurance and retirement plan.

Please give detailed personal and experience record, three competent references and salary expected in first letter.

Hazelet & Erdal, Consulting Engineers
COMMERCE BLDG.
LOUISVILLE, KENTUCKY

POSITIONS WANTED
(Continued from page 305)

General Superintendent with engineering background, age 54, desires steady employment with reliable firm. Prefer work in main office but not averse to accepting field assignments. Resume upon request. PW-4194, Engineering News-Record.

Electrical Engineer: Thirty years experience. Principally field. Covers design, estimating, review of plans-specifications, construction and inspection. No recent board work. Married. No children. Free to travel. PW-4249, Engineering News-Record.

Construction project manager, engineer. Wide experience all phases water-supply, bridge, tunnel, foundation, sanitation and heavy construction from initial planning to completion. Good organizer. Excellent background. Available soon for organizing, supervising construction projects for owners or operator. Registered civil. Age 56. PW-4271, Engineering News-Record.

Controller—Accountant. Top administrator all financial and accounting functions, income tax, insurance. 12 years engineering and construction plus 4 years public accounting experience. Work area N.Y.C. and vicinity. PW-4289, Engineering News-Record.

Supt. or Project Manager available for work in Florida or Georgia. Qualified and experience all phases. PW-3822. Engineering News-Record.

Bridge designer, project engineer, also experienced in other branches of civil engineering and report writing, would like position with company either in Florida or South America. Complete knowledge of Spanish and English. Registered, 7 years experience. PW-4087, Engineering News-Record.

Structural Engineer—MASCE, BS, NY License, over 25 years in design and construction. Proven administrative ability. Fully qualified to supervise the design of industrial buildings, bridges and other structures. Available in 30 days. PW-3981, Engineering News-Record.

Equipment Manager interested in large company connection. Available soon. PW-4347, Engineering News-Record.

Bridge Engineer, M.C.E., P.E., Member A.S.C.E., 25 years experience, 10 years with State Authority as Chief Bridge Engineer in charge of design, specs and construction. Available with short notice. PW-4348, Engineering News-Record.

Construction manager desires connection with out-of-state contractor planning to do business in Alabama. 30 years experience in field and office, part of this time conducting own business. PW-4365, Engineering News-Record.

Superintendent Brickmason Foreman experience in industrial, commercial and residential construction knowledge of estimating quantity take-off. PW-4354, Engineering News-Record.

Surveyor, lic. Ill., age 29, desires position with min. travel, with consultant or surveyor. 8 yrs. exp. party chief, field engineer. PW-4306, Engineering News-Record.

Project Manager-Superintendent, Heavy & bridge construction, 19 years experience. $200. PW-4332, Engineering News-Record.

Graduate Civil Engineer, 24. Experience in Traffic planning studies, some sanitation and light construction. Desire Foreign assignment. PW-4326, Engineering News-Record.

Draftsman, diversified structural-concrete experience, desires re-locate Washington, D. C., area. PW-4321, Engineering News-Record.

Superintendent, Field supervision, 25 years construction industrial, commercial, large scale housing, institutional, etc.; similar position desired with reliable organization. Will travel or relocate. PW-4373, Engineering News-Record.

Civil Eng. 28, married, P.E. Ohio. 5 years design and construction in highway, sewers and soils. Desire challenging position in West. PW-4374, Engineering News-Record.

PART TIME WORK WANTED

Wanted Structural Steel Drafting. Trusses-plate girders-skews. PTWW-4375, Engineering News-Record.

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(Classified Advertising)

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REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

SPECIAL SERVICES

Contract Disputes? Any contractor who has trouble and differences of opinion with Architects or engineers over their contract documents and the processing of a contract are offered my services on a fee basis dependent upon the amount of claim. Thirty-five years experience in operating my own contracting company successfully, which involved many legal disputes, settlements and appeals in court and out of court including arbitration. SS-4097, Engineering News-Record.

Construction Consultant A service to Surety Companies & contractors 30 years construction experience. G.M.C. Lucas, 2225 Wisteria St., Sarasota, Fla., Ringling 7-9843.

BUSINESS OPPORTUNITY

Natural asphalt source. Good accessibility. Potentially large. Sell or lease. Ross, 126 Gates Ave., Brooklyn 38, N. Y.

WORK WANTED

Engineering group, thoroughly experienced in design and planning of bridges and structures, excellent professional reputation, quality work only, licenses. Interested in affiliation with established firm for excess projects or special studies. WW-4229, Engineering News-Record.

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Capable Grad, C.E.'s Reg. Surveyors will provide parties and equip. Exp. all types const. CWW-4277, Engineering News-Record.

Bridgeway Associates. Design, contract drawings, specifications for all types of bridges including long span structures. Professional Engineers. CWW-4279, Engineering News-Record.

FOR SALE

Miniature Trains, steam or gas, 12"-30" gauge. Photos, details $1.00. Murray, 33E Winthrop, Rehoboth, Mass.

Engineers—Foremen—Office Men
Learn latest methods to organize and run work. Prepare for the top jobs.
Send post card for details.
GEO. E. DEATHERAGE & SON
CONSTRUCTION CONSULTANTS
P.O. Box 921 Lake Worth, Florida

WANTED TO PURCHASE
Diesel Powered Bucyrus Erie
200W, 180W or equivalent. Machine should be in good operating condition and preferably should be equipped for clamshell service. Immediate delivery desired. Also require a 5 C.Y. heavy duty clamshell dredging bucket. Replies should include price f.o.b. cars, location, full specifications and condition of machine.
The J. P. Porter Company Limited
936 Dominion Square Building, Montreal, P.Q.
Telephone: University 6-8516

SAUERMAN DRAGLINE
FOR SALE
2-CU. YD. SLACKLINE CABLEWAY
With standard Sauerman 150 hp, 2-drum variable speed hoist, with 2-cu. yd. bucket and steel mast. Used on one job only.
AMBURSEN DAM COMPANY, INC.
295 Madison Avenue New York 17, N. Y.
Murray Hill 5-7757

LIMA 1601 SHOVEL
1955—4 Cy—Used 8 Months
Cummings Diesel
WALSH CANADIAN CONSTRUCTION CO. LIMITED
901 King Edward Blvd. St. Lambert, Quebec
Orchard 1-5060

FOR SALE
F-7 Ford Tandem with 5 yd. Rex Mixer, TD-9 Cat, TD-6 Cat with Backhoe, Portable Conveyor, several 6 yd Dump Trucks. All equipment in excellent condition.
FS-4330, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

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CATERPILLAR D-8 TRACTOR s/n 2U 6894
Excellent Condition
As a SIDEBOOM ONLY—$12,500.00
As a HYDRAULIC ANGLE BLADE TRACTOR Only—$13,500.00
As a COMBINATION ANGLE DOZER AND SIDEBOOM—$15,500.00
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Phone—Merchantville 8-4610
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WANTED TO BUY
Northwest Model 25 Crane Boom 40, 45 or 50 ft. length. URGENT!
B. G. COON CONSTRUCTION CO.
278 Union Street, Luzerne, Pa.
Telephone Butler 7-3177

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20 Ton or heavier
STEEL ERECTION TRUCK CRANE
Prefer without earthmoving service.
THE R. G. SMITH CO., INC.
P.O. Box 67 Canton, Ohio

STRUCTURAL ENGINEERING
ARCHITECTURAL ENGINEERING
WILSON *Engineering Corp*

FOR SALE

SCRAPERS

6 Let. C Roadsters w/E-16 Scrapers

2 Let. C Tournamatic w/E-18 Scrapers

1 Let. C Tournamatic w/P-19 Scraper All Tires 21:00 x 25. From 50-70%

1 Let. YR Scraper 18:00 x 25 Tires

TRACTORS

1 Cat. D7 w/#25 DDPCU Series #3T

1 A-C HD-20 w/Push Plate

1 IHC TD-18 w/Push Plate DDPCU

MISCELLANEOUS

1 Link Belt DJ Lifting Crane Cat. D-7700 engine, 45 feet boom

1 Cat. 212 Grader w/Cab. Scarifier, 9:00 x 24 Tandem Drive Tires, Series #1R

EUCLID SALES and SERVICE BRANCH
3305 REPUBLIC AVENUE
WEST 9-2646
MINNEAPOLIS 26, MINNESOTA

FOR SALE
ASPHALT & CONCRETE PAVING EQUIPMENT
IMMEDIATE DELIVERY

6—Koehring 4, Multifoote 34B dual drum pavers
11—Blaw Knox & Jaeger 20'-25' concrete finishers, spreaders & Subgraders
9—Blaw Knox & Jaeger 10'—15' concrete finishers, spreaders & Subgraders
3—Cleveland Formgraders
4—Heltzel flexplane dowel, spray & joint machines
6200' Blaw Knox & Heltzel 8" x 8" road forms
9700' Blaw Knox & Heltzel 9" x 9" road forms
8600' Blaw Knox & Heltzel 10" x 10" road forms
2000' Heltzel 15" x 10" reversible airport forms
1750' Blaw Knox 14" x 14" airport forms
2500' Blaw Knox 18" x 12" reversible airport forms
9000' Heltzel 14" x 13" reversible airport forms
7—Barber Greene 879A asphalt finishers—'50—'54
3—Adnun asphalt paving machines
4—Adnun & Apsco stone spreading machines
7—Apsco 80, 85, 95 & 120 asphalt spreaders
6—Buffalo Springfield, Gallion & Huber 10 ton 3 wheel rollers
5—Buffalo Springfield, Gallion & Huber 8-12 ton tandem rollers
3—Gallion & Buffalo Springfield 3 axle tandem rollers

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WE SOLICIT YOUR INQUIRIES FOR ANY TYPE OF GOOD USED EQUIPMENT FOR ASPHALT OR CONCRETE PAVING, MINING, HEAVY HAULING, CRUSHING EARTH MOVING, OR ALLIED LINES. READY TO WORK!

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SHOP & OFFICE: Woodland Ave. off Haywood Rd. Phones: 36458-7 Day; 2-0230 Night
Mailing Address: Post Office Box 263 - Asheville, North Carolina
Branch Office: P. O. Box 2976 - Little Rock, Arkansas

USED EQUIPMENT

11—FM2 Wagon Drills
8—FM3 Wagon Drills
2—K4U Air Hoist
1—K4uL Air Hoist
2—160 Pump Cretes
2—200 Pump Cretes
2—DW10 Caterpillar Tractors with Scraper
1—Model C Tournadozer
1—Link Belt LS85 Combination Shovel, Crane and Backhoe
1—27E Rex Paver
2—34E Ransome Pavers
1—C16 Michigan Backhoe
1—IH Co. TD18 Tractors
1—BE Tractor drawn Scraper
2—C Tournapulls with scrapers

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Furnival Machinery Co.
Lancaster Ave. at 54th St.
Philadelphia 31, Pa. TRinity 7-5200

COMPRESSOR DIRECTORY
World's Best Rebuilts

25 CFM 2000 psi Ingersoll Model 3321 New
48 CFM 3500 psi Ingersoll
60 CFM Worth. or Ing. Portable (3)
75 CFM Worth. or Smith Portable (4)
105 CFM Worth. or Ing. Portable (7)
105 CFM LeRoi (diesel) Portable (1)
125 CFM Worth. Portable (3)
137 CFM 100 psi 7 x 7 Ing. ES-1
210 CFM Worth. Portable (3)
277 CFM 100 psi 8⅜ - 4⅜ x 5 CP-PE4
315 CFM Worth. or Jaeger (diesel)
434 CFM Vacuum 14 x 7 Worth.
545 CFM 100 psi Allis Chalmers.
552 CFM 100 psi 13-8 x 12 Ing. XRB
600 CFM Chicago Portable—Rotary
600 CFM Worth. Portable—Reciprocating
660 CFM 100 psi 15-9½ x 12 Worth.
720 CFM Vacuum 18 x 7 Worth. HBV
868 CFM 100 psi 17-10½ x 14 Ing. XRB
868 CFM 100 psi 17-10 x 12 Chicago OCE
1600 CFM 40 psi Fuller Rotary C-300
1721 CFM 100 psi 23-14 x 16 Ing. PRE-2
5748 CFM 50 psi 28-28 x 21 Ing. PRE-1
625 HP—3-40-2300 syn.

American
AIR COMPRESSOR CORP
DELL AVE & 38th ST. NORTH BERGEN, N. J.
Telephone UNion 5-4848

FOR SALE or RENT

30 ton . Browning Diesel Loco. Crane. 1947.
65 ton Gen. Elec. Diesel Elec. Loco.
10 ton Plymouth Diesel Locos. Std. Ga. 1949.
30 ton Wiley Stiffleg Derrick 80' Bm.
140 HP Amer. 3D. #140 Diesel Hoist & Swinger.
30 ton American #2 Guy Derrick. 90' Bm.
¾ yd. Lima #34 Diesel Crane. 90' Bm.
1½ yd. Northwest #6 Diesel Crane. Built 1949.
1600 ft. Joy Elec. Air Compressor 300 HP. New 1951.
60 ton Manitowoc 3900 Erector Crane. Rent.
100 HP Lucey Portable Boilers. 200# WP.

MISSISSIPPI VALLEY EQUIPMENT CO.
Railway Exchange, St. Louis 1, Mo.

FOR SALE

1—Used 2 Yd Shovel Attachment for 802 Lima—used 1 year $3500.00 FOB—Bronx, N. Y.
1—Used 1-¾ Yd Shovel Attachment for 362 Marion—slightly used
1—New 1½ Yd Bucket $500.00 FOB Bronx, N. Y.

BREEN — LUdlow 9-6016

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NEW BEARING PILES

48 Pcs. 8" BP 36# x 55'/64'
103 Pcs. 10" BP 42# x 55'/64'
63 Pcs. 12" BP 53# x 55'/60'

Immediate Shipment

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Delaware Ave. & Poplar St., Philadelphia, Pa.
WAlnut 2-7070

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NEW LOCATED FACTORY
4500—MANITOWOC D/LINE
80 INCH PADS—140 FT. BOOM
A. L. DOUGHERTY CO.
3333 Sheffield Ave. Hammond, Ind.
Phone Chicago, Ill. SO 8-7020

ALLIS CHALMERS HD 10 DIESEL 1950
HYDRAULIC BULLDOZER
A Very Good Buy At Only $3250
EDWARD EHRBAR, INC.
29 Messerole Ave. Brooklyn 22, New York
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8"/36# 14"/ 73#
10"/42# 14"/ 89#
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25'-50' random lengths
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Large Selection
Immediately Delivery

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NEW YORK (7), N. Y.
Telephone: BArclay 7-7323

INTERNATIONAL TD24

1952 DIESEL TRACTOR
(Angle Type) Bullgrader DDPCU
Gear Driven 7 Roller Track Frame
Good Condition $15,500
EHRBAR EQUIPMENT COMPANY
U. S. Route 22 MUrdock 8-5000 Union, N. J.

SHOVEL

1 Yd. GENERAL Model 42,
Cat. D318 Diesel Engine, 13' Crawlers, 30" Treads. Air Controls, Independent Travel. Serial No. 3126. New about 1950 or 51. Priced to Sell.
ANDERSON EQUIPMENT CO.
Box 1737 Pittsburgh 30, Pa.
Phone: LEhigh 1-6020

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2—34E Dual Drum Ransome Pavers, now working .....$12,000.00 ea.
FURNIVAL MACHINERY CO.
Lancaster Ave. at 54th St. Philadelphia 31, Pa.
TR 7-5200

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NEW—RAILS—Relayers

All sizes and weights. Also frogs, switches, spikes, bolts, tie plates, contractors' and mine equipment carried in stock.
M. K. FRANK
480 Lexington Ave. Park Bldg.
New York, N. Y. Pittsburgh, Pa.
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Frogs & Switches—Track Accessories
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SURPLUS NEW and USED **For Sale, Wanted or Rent**

RAILROAD Cross and Switch TIES

Promptly from adequate stocks
NEW and USED *(as available)*
GILLIS & COMPANY
29 East Madison St. Chicago 2

We do a Nation-Wide business in
STEEL SHEET PILING

IMMEDIATE SHIPMENT
380 pcs. 60 ft Beth. DP-2—New York
292 pcs. 60 to 30 ft. Carn. M-116—Illinois
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Vulcan and McKiernan-Terry
Steam Pile Hammers and Extractors
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RAILS

NEW — RELAYING — RELAYERS
MIDWEST STEEL CORP.
CHARLESTON W VA
IMMEDIATE DELIVERY

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Surplus New & Used
FOR SALE

STEEL SHEET PILING

486 PCS. BETH. ZP-32—32'-40' & 60'
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PILE HAMMERS & EXTRACTORS
1 McKIERNAN TERRY E4 EXTRACTOR
VULCAN 800 EXTR.—McK. T. 983 HAMMER
STOCKS—NEW ORLEANS—TAMPA—JACKSONVILLE
SEABOARD STEEL CORP.
4521 South Tamiami Trail, Sarasota, Florida
Tele. Ringling 7-0461

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400 Pcs.
20" Diameter x 16'8" Long
ACORN IRON & SUPPLY CO.
Delaware Ave. & Poplar St., Philadelphia, Pa.
WAlnut 2-7070

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AVAILABLE FOR PROMPT SHIPMENT

Pcs.	Section	Length	Location
94	MP-116	34 to 35 ft.	Wisconsin
101	MP-116	15 to 20 ft.	Iowa
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110	MP-115	35 to 60 ft.	Kansas City
130	MP-116	35 to 45 ft.	Alabama
36	MP-115	60 ft.	Nebraska
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RENT STEEL SHEET PILING

Get the exact lengths and sections you need of all standard sections, delivered *on time*—and at Foster's usual low rental rates

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LIGHT-WEIGHT STEEL PILING
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SPECIALISTS IN PRE-FAB. PIPING
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PIPE SUPPLY CO., INC.
Berry at North 13 Sts., B'klyn, N. Y.

PIPE

VALVES and FITTINGS
All Sizes in Stock
NEW—USED
GREENPOINT IRON & PIPE CO. INC
Bryant and Lloyd Streets Brooklyn, N.Y.

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2—Tandem Rollers: 1 Austin Western 5-8 ton variable weight, diesel powered, hydraulic steering. Thoroughly rebuilt. 1 Buffalo-Springfield 8-ton, gas. powered, mechanical steering. Good operating condition.

2—Buckeye Model 12 Trenchers: 1 diesel powered; 1 gasoline powered. Max. digging width 24", depth 5½'. Thoroughly rebuilt.

1—Manitowoc Model 3500 Diesel Crane, 100' boom, 30' jib, Caterpillar D-17000 engine, 60-ton capacity. Thoroughly rebuilt.

1—Model 820 Lorain Crane, serial #18221, 90' boom, capacity 2 yards, 6-cyl. D-13000 Caterpillar diesel engine. Thoroughly rebuilt.

1—Ferguson "112" double-roll Sheepsfoot Roller. Dia. of rolls 40", width 48", 112' per section. Weight empty 6,340#. Weight with ballast 10,200#.

1—Tampo Pneumatic-Tired Roller Model R13, with 13 pneumatic tires, size 7.50 x 15. Rolling width 84". Weight empty 3500#. Weight with ballast 28,000#.

1—100 KW Ideal AC Generator, 127/220/230/400/440 Volt, 3 ph., 50 or 60 cycle, with Hercules DNX diesel engine, skid mounted. Weight 16,170#.

1—20 KW 230-volt Ready Power Model RD-6D-20 Generator, direct connected to International Harvester Model UD6 diesel engine. Wt. 2450#.

PILE DRIVING EQUIPMENT

2—#1 Vulcan Hammers with standard base

5—#2 Vulcan Hammers: 2 with McDermid base—3 with standard base

McKiernan-Terry Hammers: 11B3, 10B3, 9B3, 9B2, 7, 6, 5, 3 and 1.

Write for New Stock List No. 456

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GROVETON, PA., Box 43-J, Sub. of Pittsbg. FEderal 1-2000
CHICAGO 4, ILL., 327-J So. La Salle St., WAbash 2-4661
NEW YORK 7, N. Y., 30-J Church St. WOrth 2-0036

LOW COST INSTALLATION AND OPERATION

CABLEWAYS
IMMEDIATE SHIPMENT
ELECTRIC, STEAM or DIESEL
CAPACITY 3 to 20 TONS
SELL, RENT or BUY

FOR DAMS, BRIDGES, BREAKWATERS, FILTRATION AND SEWERAGE PLANTS

FOR SPEED, ECONOMY, EFFICIENCY, FLOOD SAFETY, LABOR REDUCTION

AMBURSEN DAM CO. INC.
295 MADISON AVE. NEW YORK

NEW AND REBUILT
STORAGE BATTERY
LOCOMOTIVES
1½ to 10 Ton — 18" to 56" Track Gauge
GREENSBURG MACHINE CO.
Greensburg, Pennsylvania

Plymouth 35-ton locomotive std.ga., gas.
Lima 1201 crane-shovel-dragl., 3½-yd. diesel.
Browning 35-ton elec. Whirley gantry crane.
Johnson-Erie concrete batching, mixing plant.
Walking draglines, 9W, 200W, 6W, 5W, 4W, 3W.
Truck cranes: Lorain 20-ton, Lima 25-ton.
Steel stiffleg derricks, 75- and 35-ton
Wiley 60-ton steam Whirley barge cranes (2).

H. Y. SMITH CO.
828 N. Broadway Milwaukee 2, Wis.

UNIT 357 Self Propelled
½ CU. YD. SHOVEL
CHRYSLER IND GASOLINE POWER
11.00 x 20 12 PLY TIRES
$7,900.
EDWARD EHRBAR, INC.
29 Meserole Ave., Brooklyn 22, New York
EVergreen 3-5000

FOR SALE
2—DERRICKS AMERICAN STEEL STIFFLEGS
135' Boom, 70 ton Capacity at 120' radius, 3 drum hoist & swinger, Diesel powered.
Like New Condition
FORSYTHE EQUIPMENT CO., INC.
37-11 Vernon Blvd. Long Island City 1, N. Y.

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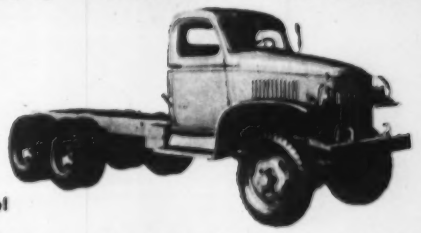
UNUSED 6x6 ARMY TRUCKS

***2½-TON, GMC & INTERNATIONAL**



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Why invest in expensive new trucks and equipment needed to get the roughest off-road jobs done when you can save up to $3,000 on ONE truck alone—and get the job done right!

Compare our tandem axle trucks with front wheel drive, 10 forward speeds, overdrive and new mud and snow tires with similar equipment elsewhere. See for yourself how TWO of our trucks cost you even LESS than one new truck!

If planning to buy a truck, get in touch with us right away. There's no obligation . . . and we deliver on approval!

For Specifications, Prices, Delivery Write, wire or phone COLLECT—JAckson 5-7841
Milton Y. Toombs, Jr. Sales Manager

MEMPHIS EQUIPMENT CO.
Construction and automotive equipment and parts
766 S. THIRD ST. • MEMPHIS, TENN.

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CRAWLERS — Capacities to 60 tons, Booms to 180 ft.
TRUCK CRANES — Capacities to 35 tons, Booms to 180 ft.

P and H, Lima and Manitowoc.
Top-Condition erection cranes

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CRANE SERVICE, INC.
East Hartford, Connecticut JAckson 8-4106

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DIESEL ELECTRIC LOCOMOTIVES
STANDARD GAUGE
25 - 35 - 40 - 50 - 65 - 75 - 100 tons
Write for Details
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7010 Empire State Building
New York 1, N. Y.

FOR SALE
HEAVY DUTY CONSTRUCTION EQUIPMENT
IMMEDIATE DELIVERY

1—Bucyrus Erie 38B shovel, backhoe, crane
1—Bucyrus Erie 38B dragline—REBUILT
1—Lima 802 dragline only—80' boom
2—Northwest 6 shovel and/or draglines
2—Northwest 6 backhoes—new '52 & '54
1—Marion 93-M dragline—REBUILT
2—Bucyrus Erie 54B shovels, 1 w/ 71B front
3—Bucyrus Erie draglines—'53 & '54
4—Northwest 80D shovel and/or draglines '53 & '54
3—Northwest 95 draglines—new '50—'54
3—Lima 1201 shovel and/or draglines—'50—'53
7—Manitowoc 4500, Marion 111M & Lima 2400 shovel and/or draglines—late models
9—Cat. DW-21 tractors w/Movall rear dump wagons used 2000 hrs.
4—Cat. DW-21 tractors w/ Athey PR-21 rock wagons
5—Cat. DW-21 tractor-scraper rigs—new '55
2—Cat. D-9 tractors w/ angledozers—3000 hrs.
6—Cat. D-8 tractors 2U20000 series—14A & 15A
11—Cat. 80 & Ld. FP scrapers
8—Koehring WD-60 dumpsters
12—Euclid 22 ton rear dump trucks new '53-'55
14—Euclid 15 ton rear dump trucks new '52-'54
3—Cat. #12 motor graders—8T series
4—50 Ton rubber tired compactors
3—sets 60" x 60" double drum sheepsfoot rollers
4—Cat. D-6 & AC H.D. 9 traxcavators
4—Lorain MC-414 truck cranes new '50—'54
2—Bucyrus Erie 22B truck cranes—late models
1—Northwest 25 truck crane—near new
2—P & H 35 ton Model 555 truck cranes

WRITE - WIRE - CALL:

WE SOLICIT YOUR INQUIRIES FOR ANY TYPE OF GOOD USED CONSTRUCTION, ASPHALT OR CONCRETE PAVING, MINING, HEAVY HAULING, CRUSHING, EARTH MOVING OR ALLIED LINES OF EQUIPMENT READY TO WORK!

The AL J. GOODMAN and Sons Company
CONSTRUCTION EQUIPMENT
Shop & Office: Woodland Ave. off Haywood Rd — Phones: 38456-7 Day, 2-0230 Night
Mailing Address: P. O. Box 263 - Asheville, North Carolina
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FOR SALE
IMMEDIATE DELIVERY

Noble CA-245 concrete plant w/ 240 ton 5 compartment agg. bin; cement silos, elevator, fully automatic w/ 56S mixer, new 1951.

Noble CA-154 automatic concrete plant, 150 ton 4 comp. bin; 2 elevators; cement silos; used 1 job for 40 days.

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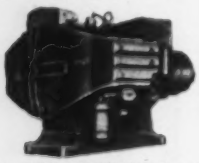

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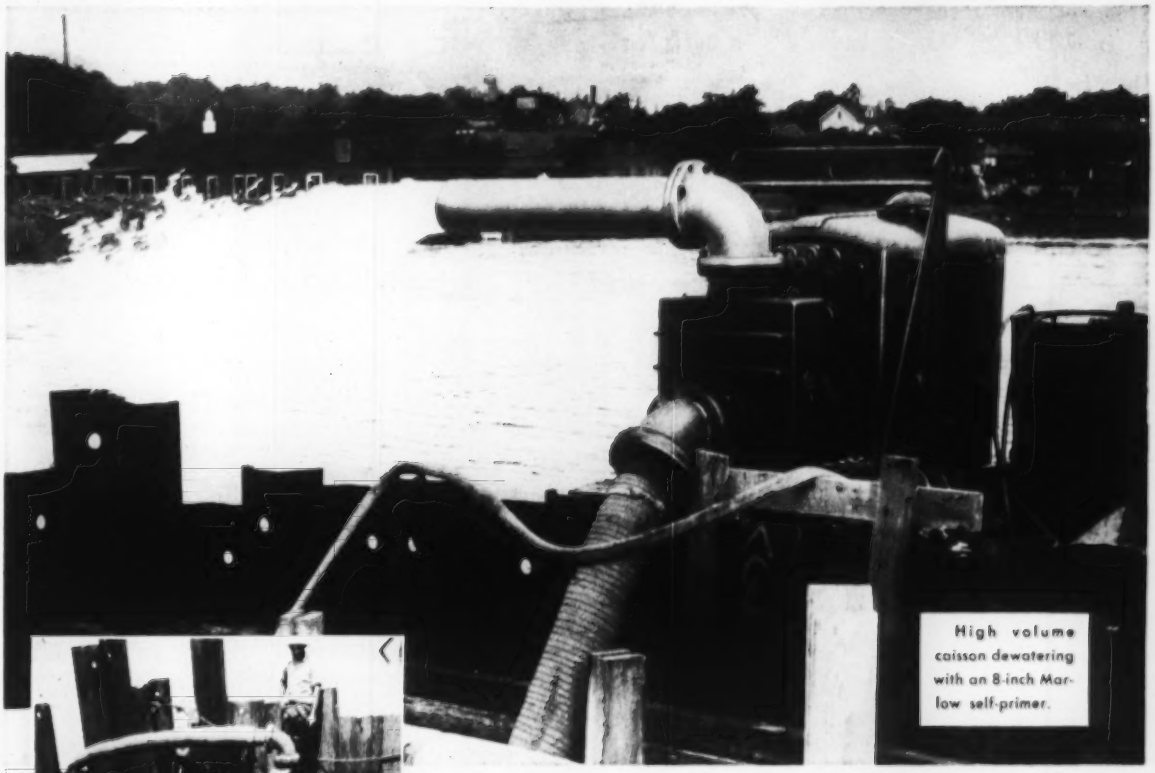

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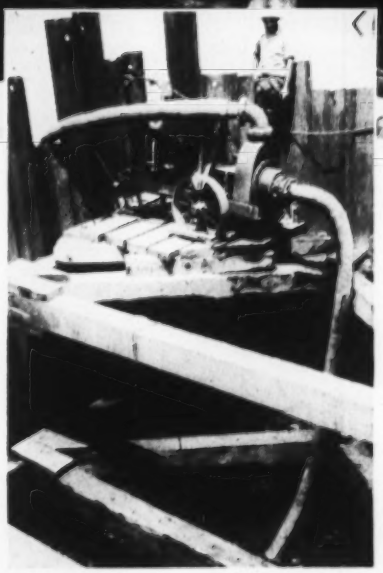

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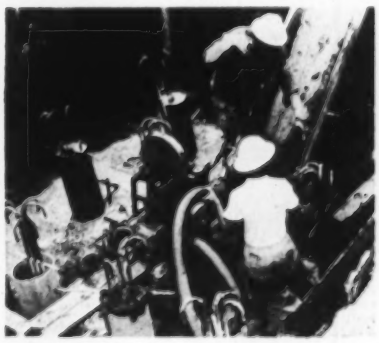

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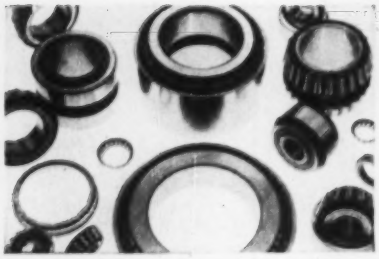

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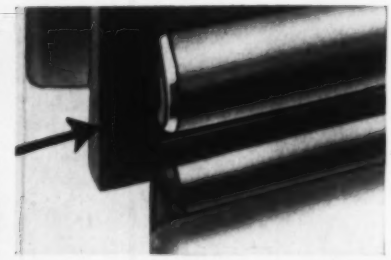

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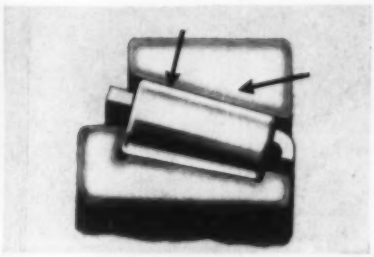

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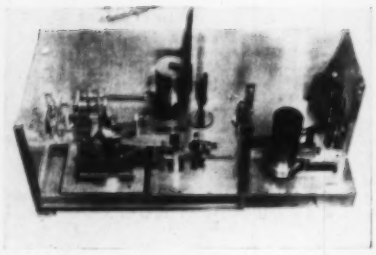
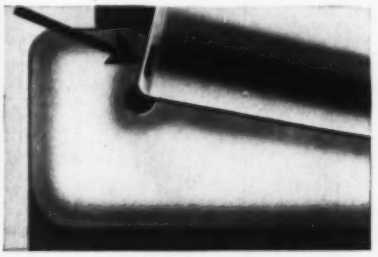


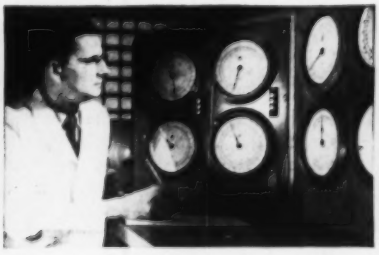
MICRO-INCH FINISH is standard for Timken bearings. This profilograph checks contours and smoothness of circular surfaces to a millionth of an inch, helps us make Timken bearings truer, quieter, longer-wearing.

6,525 SIZES, the world's largest selection of tapered roller bearings. From bearings smaller than your finger to 71½" in inside diameter, the Timken Company can supply the size you need for any specific application.

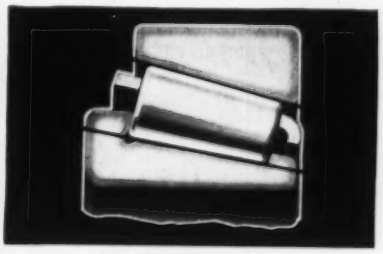


POSITIVE ROLLER ALIGNMENT is assured because the taper in Timken bearings holds ends of rollers snug against the rib. The taper in Timken bearings lets them take radial or thrust loads or any combination.

ACCURATE TO 50 MILLIONTHS of an inch. This Universal Measuring Machine checks gages and machine parts used to make Timken bearings. Our gage laboratory, one of the world's best equipped, helps make Timken tapered roller bearings your No. 1 bearing value.



WE MAKE OUR OWN FINE ALLOY STEEL. No other American bearing maker does. This spectrometer helps control steel quality—in 40 seconds gives the exact chemical analysis of a melt. In a few minutes, results are flashed to the melter. It's another step in rigid quality control.



FULL LINE OF CONTACT between Timken bearings' rollers and races gives them *extra* load-carrying capacity. To get *all* these advantages, specify "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN *TAPERED ROLLER BEARINGS ROLL THE LOAD*

TRADE-MARK REG. U. S. PAT. OFF.